

**THE DEPARTMENT OF HOMELAND SECURITY  
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM**

**PHASE I PROGRAM SOLICITATION FY 12.1  
for the  
Science and Technology (S&T) Directorate**

**Solicitation Number: DHS SBIR-2012.1**

**KEY DATES:**

<b>Pre-solicitation issued:</b>	<b>October 25, 2011</b>
<b>Solicitation released:</b>	<b>November 16, 2011</b>
<b>Phase I proposals submitted and accepted:</b>	<b>November 16, 2011 through January 5, 2012</b>
<b>Direct contact with technical points of contact permitted:</b>	<b>October 25, 2011 through November 15, 2011</b>
<b>Last day to submit questions to <a href="mailto:STSBIR.PROPOSALS@dhs.gov">STSBIR.PROPOSALS@dhs.gov</a>:</b>	<b>December 22, 2011 no later than 3:00 p.m. Eastern Time (ET)</b>
<b>Last date replies posted to the SBIR Program website at <a href="https://sbir2.st.dhs.gov">https://sbir2.st.dhs.gov</a>:</b>	<b>December 29, 2011</b>
<b>Closing date of Phase I solicitation/deadline for receipt of proposals:</b>	<b>January 5, 2012, 2:00 p.m. ET</b>

**IMPORTANT:**

- **Deadline for Receipt of Phase I Proposals.** Proposals must be completely uploaded and submitted via the electronic submission system at <https://sbir2.st.dhs.gov> and electronically date stamped no later than 2:00 PM ET on January 5, 2012.
- **Important modifications have been made to this Solicitation since the pre-solicitation was released on October 25, 2011.**
  - **Topic author information has been removed from the topic descriptions for the solicitation open.** No further direct contact between proposers and technical points of contact shall occur for reasons of competitive fairness. Proposers may submit written questions to [STSBIR.PROPOSALS@dhs.gov](mailto:STSBIR.PROPOSALS@dhs.gov). Questions must be limited to technical information related to improving the understanding of a particular topic's requirements. If information given in response to a question is deemed necessary for the preparation of proposals, that information will be made available to the public for general viewing on the FedBizOpps.Gov website at <https://fbo.gov> and on the DHS website at <https://sbir2.st.dhs.gov>. All proposers are advised to monitor both the FedBizOpps.Gov website and the DHS SBIR website for questions and

answers, and other information relevant to the topic under which they are proposing.

- **DHS SBIR Topic H-SB012.1-001.** The topic description for topic H-SB012.1-001 has been modified to provide a break-out of specific qualifications.
- **DHS SBIR Topic H-SB012.1-003.** The topic description for topic H-SB012.1-003 was modified by changing one word in second sentence in the description paragraph – “identify” has been changed to read “classify”.
- **DHS SBIR Proposal Submission System.** A new Proposal Submission system was implemented in April 2011. Please allow sufficient time to register your company, and submit your full complete Phase I proposal. Register early and begin the submission process early. Late proposals will not be accepted or evaluated. Proposals received via any other means except the DHS submission website will not be accepted or evaluated. As the close date draws near, heavy traffic on the web server may cause delays. Plan ahead and leave ample time to prepare and submit your proposal. Proposers bear the risk of website inaccessibility due to heavy usage in the final hours before the Solicitation closing time. In accordance with FAR 52.215-1, proposers are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in the solicitation by the time specified in the Solicitation. FAR Clause 52.215-1, Instruction to Offerors – Competitive Acquisition (JAN 2004) is hereby incorporated into this Solicitation in its entirety. Section 6 of this Solicitation provides registration and submission instructions. Proposers are also advised to review the step-by-step registration and submission instructions provided in the Small Business Innovation Research (SBIR)/Broad Agency Announcement (BAA) Public Portal: Registration and Submissions Training Guide found at <https://sbir2.st.dhs.gov>, click on “Reference Materials”.
- **Option Cost Proposal.** If the offeror chooses to include, within the 25 page limit of the Technical Proposal, an option which furthers the effort and will bridge the funding gap between Phase I and the Phase II start, the Phase I Option Cost Proposal must be included as part of the Phase I proposal, if the proposer would like to be considered for interim funding. The Phase I option may be exercised upon the decision to fund the Phase II project. The option should not exceed \$50,000 and four (4) months. Further details are provided in Section 3.5 of this Solicitation.
- **Mandatory Briefing Chart.** A mandatory one-page briefing chart must be submitted to summarize the project. The Briefing Chart will not be evaluated or used in the evaluation process. It will be used to describe the project if the proposal is recommended for award. It must not contain any proprietary or classified data. Submission of the Briefing Chart is not counted against the 25-page limit. See Section 6.2(b)(5) for further details. The template for the mandatory Briefing Chart is provided in Section 10.

- **Classified Proposals.** Classified proposals are not accepted under the DHS SBIR Program.
- **Vendor Questions.** Vendors may submit questions to [STSBIR.PROPOSALS@dhs.gov](mailto:STSBIR.PROPOSALS@dhs.gov) no later than 3:00PM ET, December 22, 2011. DHS will post replies no later than December 29, 2011 on the SBIR Program website at <https://sbir2.st.dhs.gov>.
- **No Printed Solicitation Books.** Solicitations are available only in electronic format from the FedBizOpps.Gov website, <https://www.fbo.gov>, in accordance with the Government Paperwork Elimination Act (GPEA). For convenience, the DHS SBIR Program website at <https://sbir2.st.dhs.gov> will link to the FedBizOpps.Gov website after the Solicitation is posted there.
- **About this DHS SBIR FY 12.1 Solicitation.** There are six (6) topics in this Solicitation for which proposals are sought.
- **Contract Specialist/Contracting Officer: Jenista M. Featherstone,** [Jenista.featherstone@dhs.gov](mailto:Jenista.featherstone@dhs.gov)
- **For administrative purposes only,** submissions to this Solicitation will be handled by DHS Support Contractors.
- **Information:** If you have questions about the DHS SBIR Program, please submit your questions via email [STSBIR.PROGRAM@dhs.gov](mailto:STSBIR.PROGRAM@dhs.gov). If you have questions or problems related to the electronic submission of your proposal, please contact the SBIR Help Desk at [dhssbir@reisys.com](mailto:dhssbir@reisys.com) or call 703-480-7676.

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**DHS SOLICITATION FOR THE  
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM  
for the  
Science and Technology (S&T) Directorate**

***1.0 SBIR PROGRAM DESCRIPTION***

***1.1 SBIR Introduction***

The Department of Homeland Security (DHS) Small Business Innovation Research (SBIR) Program Office, on behalf of the Science & Technology (S&T) Directorate invites small business concerns to submit proposals under this Solicitation for the Small Business Innovation Research (SBIR) Program. Small business concerns with the capability to conduct research or research and development (R/R&D) in any of the homeland security-related topic areas described in Section 8.0, and to commercialize the results of that R/R&D are encouraged to participate.

Objectives of the DHS SBIR Program include stimulating technological innovation, strengthening the role of small business in meeting DHS research/research and development needs, fostering and encouraging participation of socially and economically disadvantaged persons and women-owned small business concerns in technological innovation, and increasing the commercial application of DHS supported research or R&D results.

The Federal SBIR Program is mandated by the Small Business Innovation Development Act of 1982 (Public Law 97-219), the Small Business Research and Development Act of 1992 (Public Law 102-564), and the Small Business Reauthorization Act of 2000 (Public Law 106-554). Most recently, Public Law 112-36 provided for an additional temporary extension of programs under the Small Business Act and the Small Business Investment Act of 1958, extending authorization of the SBIR Program to November 18, 2011. A new authorization or extension (continuing resolution) is anticipated prior to this end date. The basic design of the DHS SBIR Program is in accordance with the Small Business Administration (SBA) SBIR Policy Directive, 2002. The guidelines presented in this Solicitation incorporate and use the flexibility of the SBA Policy Directive to encourage proposals based on scientific and technical approaches most likely to yield results important to DHS and the private sector.”

***1.2 SBIR Three Phase Program***

SBIR opportunities, including this DHS FY12.1 SBIR Program Solicitation, are solicited pursuant to the public laws cited above. The purpose of Phase I is to determine, insofar as possible, the scientific, technical, and commercial merit and feasibility of ideas submitted under the SBIR Program. For the S&T SBIR Program, Phase I (base) awards are up to \$100,000 in cost and up to a six-month period of performance for the research or research and development. Proposals must concentrate on that research or research and development (R/R&D) which will significantly contribute to proving the scientific, technical, and commercial feasibility of the proposed effort, the successful completion of which is a prerequisite for further DHS support in Phase II. Several different proposed solutions to a given topic may be funded. The measure of

Phase I success includes evaluations of the extent to which Phase II results would have the potential to yield a product or process of continuing importance to DHS and/or the private sector. Proposers are encouraged to consider whether the research or research and development they are proposing to DHS also has private sector potential, either for the proposed application or as a base for other applications. DHS encourages proposers to include, within the 25 page limit, an option which furthers the effort and will bridge the funding gap between Phase I and the Phase II start. Phase I options may be exercised upon the decision to fund the Phase II project. The option should not exceed \$50,000 and four (4) months. Further details are provided in Section 3.5 of this Solicitation.

Subsequent Phase II awards may be made to small business concerns on the basis of results of their Phase I efforts and the scientific, technical, and commercial merit of the Phase II Proposal. For the S&T SBIR Program, Phase II awards are up to \$750,000 in cost, and up to 24 months in duration. Phase II is the principal research or research and development effort and is expected to produce a well-defined deliverable prototype. A more comprehensive proposal will be required for Phase II. Further details are provided in Section 3.7 of this Solicitation.

SBIR Phase III refers to work that derives from, extends, or logically concludes effort(s) performed under prior SBIR funding agreements. Phase III is typically oriented towards commercialization of SBIR research or technology. SBIR awardees may seek contracts with the private sector or the Federal government (non-SBIR federal government funding sources) to further develop or supply goods or services related to the work performed under a concerns SBIR contract(s).

***This Solicitation is for Phase I Proposals only.*** Only proposals submitted in response to this Solicitation will be considered for Phase I awards. Only proposals submitted in response to topics contained in this Solicitation will be accepted and considered for Phase I award. Proposers who were not awarded a contract in response to a prior SBIR solicitation may update or modify and re-submit the same or modified proposal only if it is responsive to any of the topics listed in Section 8.0 of this Solicitation.

A separate solicitation will not be issued for Phase II of this SBIR FY 12.1 Program Solicitation. **Only those concerns that received Phase I awards are eligible to participate in Phases II and III.**

DHS will select and invite Phase I awardees to submit a Phase II Proposal to continue the research and maintain the momentum of the Phase I R/R&D. DHS uses the invitation process to accomplish an expeditious review leading to a Phase II award. Phase II Proposals shall be submitted online in accordance with Section 6.0 of this Solicitation.

DHS is not obligated to make any awards under either Phases I, II, or III, and all awards are subject to the availability of funds. DHS is not liable for any costs expended by the proposer before award of any contract.

### ***1.3 SBIR Proposer Eligibility and Limitations***

Each proposer must qualify as a small business for research or research and development purposes as defined in Section 2.0 of this Solicitation and must certify to this on Cover Sheet A of its Proposal. For both SBIR Phases I and II, the primary employment of the principal investigator must be with the small business concern at the time of the award and during the

conduct of the proposed effort. Primary employment means that more than one-half of the principal investigator's time is spent with the small business. Primary employment with a small business concern precludes full-time employment at another organization. For both Phase I and Phase II, all research or research and development work shall be performed by the small business concern and its subcontractors in the United States. Deviations from the requirements in this paragraph must be approved in writing by the Contracting Officer (during contract negotiations).

Joint ventures and limited partnerships are permitted, provided that the entity created qualifies as a small business in accordance with the Small Business Act, 15 USC 631, and the definition included in Section 2.2 of this Solicitation.

#### 1.4 *SBIR Research and Analytical Work*

- a. **For Phase I**, a minimum of two-thirds of the research and/or analytical work shall be performed by the proposing small business concern. The percentage of work is usually measured by both direct and indirect costs for Phase I.
- b. **For Phase II**, a minimum of one-half of the research and/or analytical work shall be performed by the proposing small business concern, unless otherwise approved in writing by the Contracting Officer. The percentage of work is usually measured by both direct and indirect costs for Phase II.

#### 1.5 *SBIR Conflicts of Interest*

Awards made to small business concerns owned by or employing current or previous Federal Government employees could create conflicts of interest for those employees and could be in violation of federal law. Such proposers should contact the cognizant Ethics Counselor from the employee's Government agency for further guidance.

#### 1.6 *Questions about the SBIR Solicitation Topics and Proposal Submission*

- a. **Where to Get Help.** All general questions about this Solicitation and other program-related areas, as well as proposal preparation, should be submitted via email to [STSBIR.PROPOSALS@dhs.gov](mailto:STSBIR.PROPOSALS@dhs.gov). Questions about the electronic submission of proposals should be submitted to the Help Desk at 703-480-7676, or via email to [dhsbir@reisys.com](mailto:dhsbir@reisys.com). The Help Desk may be contacted from 8:30 a.m. to 5:00 p.m. ET.
- b. **The DHS SBIR Website.** The DHS SBIR website at <https://sbir2.st.dhs.gov> offers electronic access to: SBIR solicitations, frequently asked questions (FAQs), answers to FAQs, abstracts of previously funded SBIR Phase I and Phase II projects, the latest updates on the SBIR Program, and hyperlinks to other useful information. Phase I award information is posted on the website generally four months after the close of the solicitation.
- c. **Electronic Proposal Submission.** DHS uses electronically supported business processes for the SBIR program. All proposers must have access to the Internet and an email address. (Note: If you do not have direct access to the Internet, public access to the Internet is available at most public libraries, local schools or at a Small Business Development Center (SBDC) in your area.) All Phase I and Phase II Proposals shall be submitted via the electronic submission website at <https://sbir2.st.dhs.gov>. Paper



submissions and proposals received by any other means will not be accepted, evaluated or considered for award. The Small Business Innovation Research (SBIR)/Broad Agency Announcement (BAA) Public Portal: Registration and Submissions Training Guide can be found at <https://sbir2.st.dhs.gov>, click on “Reference Materials.” The Guide provides step-by-step instructions for registering your company and submitting your proposal for the DHS SBIR Program. (Please follow the instructions for submitting an SBIR proposal. Note that the SBIR program does not accept white papers – these are limited to the BAA process.) Proposers are strongly encouraged to read this guide and follow the instructions for proposal submission.

- d. **General Questions about the DHS SBIR Program.** General questions pertaining to the DHS SBIR Program should be submitted to [STSBIR.PROGRAM@dhs.gov](mailto:STSBIR.PROGRAM@dhs.gov) or by calling the DHS SBIR Program Director, Ms. Elissa I. Sobolewski, 202-254-6768.
- e. **Technical Questions about Solicitation Topics.** From October 25, 2011 through November 15, 2011, this Solicitation is issued for pre-release on the Federal Business Opportunities (<https://www.fbo.gov>) website and linked on the DHS SBIR website (<https://sbir2.st.dhs.gov>) with the names, phone numbers and email addresses of the Technical Point of Contact for each technical topic. During this period, proposers have an opportunity to contact Technical Points of Contact by telephone or by email to ask technical questions about specific technical topics contained in this Solicitation. Questions should be limited to specific information related to improving the understanding of a particular topic’s requirements. Proposers may not ask for advice or guidance on its solution approach, nor submit additional material to the Technical Points of Contact. If information given in response to a question is deemed necessary for the preparation of proposals, that information will be made available via an updated topic description(s).

**No further direct contact between proposers and Technical Points of Contact shall occur from November 16, 2011 through January 5, 2012 for reasons of competitive fairness.** However, proposers may submit written questions to [STSBIR.PROPOSALS@dhs.gov](mailto:STSBIR.PROPOSALS@dhs.gov). Questions must be limited to technical information related to improving the understanding of a particular topic’s requirements. Any other questions, such as those asking for advice or guidance on solution approach, will not receive a response.

If information given in response to a question is deemed necessary for the preparation of proposals, that information will be made available to the public for general viewing on the FedBizOpps.Gov website at <https://fbo.gov> and on the DHS website at <https://sbir2.st.dhs.gov>. Responses to the questions received after November 15, 2011 will be posted on FedBizOpps.Gov as an amendment to the Solicitation. Responses to questions received after December 22, 2011 will be posted on the SBIR Program website at <https://sbir2.dhs.gov>.

- f. **All proposers are advised to monitor both the FedBizOpps.Gov website at <https://www.fbo.gov> and the DHS SBIR website at <https://sbir2.st.dhs.gov> during the solicitation period for questions and answers, and other information relevant to the topic under which they are proposing.**

## 1.7 *Outreach Conferences and Events*

The DHS SBIR Program team participates in the National SBIR Conferences and in many regional and state-organized conferences for small business. For information on these events, visit the DHS SBIR Program website at <https://sbir2.st.dhs.gov> and click on “News and Events,” or refer to the <http://www.sbir.gov> website for upcoming SBIR outreach events. The DHS Program Office encourages small disadvantaged, women-owned, veteran-owned, service-disabled veteran-owned, and socially and economically disadvantaged small businesses to participate in the conferences and events, as well as in the solicitations.

## 2.0 *DEFINITIONS*

The following definitions apply for the purposes of this Solicitation:

### 2.1 *Research or Research and Development*

Any activity that is:

- a. **Basic Research.** Scientific study and experimentation to provide fundamental knowledge required for the solution of problems.
- b. **Exploratory Development.** A study, investigation or minor development effort directed toward specific problem areas with a view toward developing and evaluating the feasibility and practicability of proposed solutions.
- c. **Advanced Development.** Proof of design efforts directed toward projects that have moved into the development of hardware for test.
- d. **Engineering Development.** Full-scale engineering development projects for DHS or first responder use but which have not yet received approval for production.
- e. **Human Research.** For the purposes of Human Research Protection, “research” is defined as a systematic investigation including RDT&E, designed to develop generalizable knowledge (32 CFR 219).

### 2.2 *Small Business Concern*

A small business concern is one that, on the date of award for both Phase I and Phase II funding agreements, meets all of the following criteria:

- a. Is organized for profit, with a place of business located in the United States, which operates primarily within the United States or which makes a significant contribution to the United States economy through payment of taxes or use of American products, materials, or labor;
- b. Is in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture, there can be no more than 49 percent participation by foreign business entities in the joint venture;
- c. Is (1) at least 51 percent owned and controlled by one or more individuals who are citizens of the United States or permanent resident aliens in the United States,(2) at

least 51% owned and controlled by another business concern that is itself at least 51% owned and controlled by individuals who are citizens of, or permanent resident aliens in the United States; or (3) a joint venture in which each entity to the venture must meet the requirements of either (1) or (2) of this section; and

- d. Has, including its affiliates, not more than 500 employees.

Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliates" is defined in greater detail in 13 CFR 121.103. The term "number of employees" is defined in 13 CFR 121.106.

A business concern may be in the form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust, or cooperative. Further information may be obtained at <http://sba.gov/size>, or by contacting the Small Business Administration's Government Contracting Area Office or Office of Size Standards.

### **2.3 *Research Institution***

A Research Institution is any organization located in the United States that is:

- a. A university;
- b. A nonprofit institution as defined in section 4(5) of the Stevenson-Wydler Technology Innovation Act of 1980; or
- c. A contractor-operated federally funded research and development center (FFRDC), as identified by the National Science Foundation in accordance with the government-wide Federal Acquisition Regulation issued in accordance with section 35(c)(1) of the Office of Federal Procurement Policy Act. (See <http://www.nsf.gov/statistics/ffrdc/> for a list of eligible FFRDCs.)

### **2.4 *Socially and Economically Disadvantaged Small Business Concern***

A socially and economically disadvantaged small business concern is one that is at least 51% owned and controlled by one or more socially and economically disadvantaged individuals, or an Indian tribe, including Alaska Native Corporations (ANCs), a Native Hawaiian Organization (NHO), or a Community Development Corporation (CDC). Control includes both the strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations. See 13 CFR 124.109, 124.110, and 124.111 for special rules pertaining to concerns owned by Indian tribes (including ANCs), NHOs or CDCs, respectively.

### **2.5 *Women-Owned Small Business Concern***

A women-owned small business is one that is at least 51 percent owned and controlled by one or more women, or in the case of a publicly owned business, at least 51 percent of the stock of which is owned by women, and who also control and operate it. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management of the business.

## 2.6 ***Funding Agreement***

Any contract, or grant, or cooperative agreement entered into between any Federal Agency and any small business concern for the performance of experimental, developmental, or research work funded in whole or in part by the Federal Government.

## 2.7 ***Subcontract***

A subcontract is any agreement, other than one involving an employer-employee relationship, entered into by an awardee of a funding agreement calling for supplies or services for the performance of the original funding agreement. This includes consultants. See Section 3.5.b (9) of this Solicitation.

## 2.8 ***Commercialization***

Commercialization is the process of developing marketable products or services and delivering products or services for sale (whether by the originating party or by others) to Government or commercial markets.

## 2.9 ***Essentially Equivalent Work***

This occurs when (1) substantially the same research is proposed for funding in more than one contract proposal or grant application submitted to the same Federal agency; (2) substantially the same research is submitted to two or more different Federal agencies for review and funding consideration; or (3) a specific research objective and the research design for accomplishing an objective are the same or closely related in two or more proposals or awards, regardless of the funding source.

## 2.10 ***Historically Black Colleges and Universities/Minority Institutions (HBCU/MI)***

Listings for the Historically Black Colleges and Universities (HBCU) and Minority Institutions (MI) are available through the Department of Education website, <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

## 2.11 ***Historically Underutilized Business Zone (HUBZone) Small Business Concern***

HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration. See <http://www.sba.gov/hubzone> for more details.

## 2.12 ***Service-Disabled Veteran***

A veteran with a disability that is service connected as defined in 38 U.S.C. §101(16).

## 2.13 ***Small Business Concern Owned and Controlled by Service-Disabled Veterans***

A small business concern that:

- a. not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

- b. the management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such a veteran.

#### 2.14 ***Small Business Concern Owned and Controlled by Veterans***

A small business concern that:

- a. not less than 51 percent of which is owned by one or more veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more; and
- b. the management and daily business operations of which are controlled by one or more veterans.

#### 2.15 ***United States***

"United States" means the fifty states, the territories and possessions of the Federal Government, the Commonwealth of Puerto Rico, the Republic of the Marshall Islands, the Federated States of Micronesia, the Republic of Palau, and the District of Columbia.

#### 2.16 ***Manufacturing-related R&D as a Result of Executive Order 13329***

This Solicitation complies with Executive Order 13329, "Encouraging Innovation in Manufacturing", issued on February 26, 2004, directing Federal agencies that administer the SBIR program to encourage innovation in manufacturing related research and development consistent with the objectives of each agency and to the extent permitted by law. DHS encourages the submission of proposals that deal with some aspect of innovative manufacturing technology. If a proposal has a connection to manufacturing, for example, (i) manufacturing processes, equipment, and systems; or (ii) manufacturing workforce skills and protection, this should be indicated in the Section 4 of the proposal (Related Work) and a brief explanation of how it is related to manufacturing should be provided.

#### 2.17 ***Energy Independence and Security Act of 2007***

The Energy Independence and Security Act of 2007, section 1203, amended the Small Business Act (15 U.S. C. 638) to encourage innovation in energy efficiency. The Act encourages federal agencies and departments to give high priority to small business concerns that participate in or conduct energy efficiency or renewable energy system research and development projects. If a proposal has a connection to energy efficiency or alternative and renewable energy, this should be indicated in Part 4 of the proposal (Related Work) and a brief explanation of how it is related to energy efficiency or alternative and renewable energy should be provided.

#### 2.18 ***Foreign National (Foreign Person) means any person who is not:***

- a. a citizen or national of the United States; or
- b. a lawful permanent resident; or
- c. a protected individual as defined by 8 U.S.C.1324b(a)(3).

"Lawful permanent resident" is a person having the status of having been lawfully accorded the privilege of residing permanently in the United States as an immigrant in accordance with the immigration laws and such status not having changed.

"Protected individual" is an alien who is lawfully admitted for permanent residence, is granted the status of an alien lawfully admitted for temporary residence under 8 U.S.C.1160(a) or 8 U.S.C.1255a(a)(1), is admitted as a refugee under 8 U.S.C.1157, or is granted asylum under section 8 U.S.C.1158; but does not include (i) an alien who fails to apply for naturalization within six months of the date the alien first becomes eligible (by virtue of period of lawful permanent residence) to apply for naturalization or, if later, within six months after November 6, 1986, and (ii) an alien who has applied on a timely basis, but has not been naturalized as a citizen within two (2) years after the date of the application, unless the alien can establish that the alien is actively pursuing naturalization, except that time consumed in the Service's processing the application shall not be counted toward the 2-year period.

### ***2.19 Research Involving Human Subjects***

DHS has adopted Department of Health and Human Services (HHS) policies governing human subjects research, as set forth in 45 C.F.R. Part 46 (Subparts A-D). Subpart A of 45 C.F.R. part 46 is HHS' codification of the Federal Policy for the Protection of Human Subjects (also known as The Common Rule) which represents the basic foundation for the protection of human subjects in most research conduct or supported by U.S. Federal departments and agencies. All research involving human subjects shall be conducted in accordance with DHS Management Directive Number 026-04.

### ***2.20 Research Involving Animal Subjects***

DHS has adopted the principles of the U.S. Department of Agriculture (USDA) implementation of the Animal Welfare Act, the Public Health Service (PHS) implementation of the Health Care extension Act, and the other related federal principles and guidelines as they represent the ethical foundation for the care and use of animals in research. All research involving the care and use of animals in research shall be conducted in accordance with DHS Management Directive Number 026-01.

## ***3.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS***

### ***3.1 Proposal Requirements***

A proposal to the Science and Technology Directorate and the Domestic Nuclear Detection Office, as appropriate, under the DHS SBIR Program must provide sufficient information to persuade DHS that the proposed work represents an innovative approach to the investigation of an important scientific or engineering problem and is worthy of support under the stated criteria. The proposed research or research and development must be responsive to the chosen topic (see Section 4.1 of this Solicitation). Any small business contemplating submitting a proposal for work on any specific topic shall determine that (a) the technical approach has a reasonable chance of meeting the topic objective, (b) this approach is innovative, not routine, with commercial application, and (c) the company has the capability to implement the technical approach, i.e., has or can obtain people and equipment suitable to the task.

Classified proposals are not accepted under the DHS SBIR Program. Classified proposals will not be accepted under this DHS S&T SBIR Solicitation and will be appropriately destroyed upon receipt. In the event that classified work will be undertaken in Phase II, companies invited to submit a proposal must have or be able to obtain the proper facility and personnel clearances in order to perform Phase II work.

Proposers must be registered in the DHS SBIR Proposal Submission system at <https://sbir2.st.dhs.gov> in order to prepare and submit proposals (see Section 6.0).

### 3.2 *Administrative and Technical Checklist*

Proposers responding to this Solicitation should note the administrative and technical preparation tips listed below.

- a. Read and follow all instructions contained in this Solicitation.
- b. **IMPORTANT:** Please refer to the “Registrations and Submissions Training Guide” at <https://sbir2.st.dhs.gov> and click on “Reference Materials” for step-by-step instructions for registering your company and submitting your proposal.
- c. **IMPORTANT:** Before submitting a proposal for the first time, your company must first be registered in the system. It is recommended that the Business Official, or an authorized representative designated by the Business Official, be the first person to register your company. Your company’s Taxpayer Identification Number (TIN) is required during registration. (If your company does not have a TIN, you can generate a unique ID by following the prompts provided in the system.) After your company is registered, new users must register by associating their information with the company’s existing record. You will need to know your company’s TIN, the state where your company is registered as a taxpayer, and the Company PIN (Personal Identification Number) that was established at the time the company was registered in the system. When registration is complete, users can begin the proposal submission process.
- d. **Submit your proposal electronically via the website (<https://sbir2.st.dhs.gov>) and prepare your SBIR Proposal as instructed on the website.** A complete full Proposal consists of Cover Sheet A, Cover Sheet B, the Cost Proposal, the Technical Proposal, and mandatory Briefing Chart (template provided in Section 10). (For Phase II Proposals, a Company Commercialization Report is also required if the proposer has received prior SBIR Phase II funding.) Cover Sheets A and B, as well as the Cost Proposal, are fillable forms in the system and completed online. The Cover Sheet consists of two different forms – Cover Sheet A and B – which must be completed. The Cost Proposal page has seven different sections/tabs that must be completed (tabs are labeled as follows: Section A, Section B, Section C, Section D, Section E, Section F, and Summary). The Technical Proposal must be uploaded in PDF format from a computer via the Internet utilizing a secure communications protocol. The Technical Proposal must not exceed 10 MB. mandatory Briefing Chart (PDF format, not to exceed 2MB) must be uploaded to the system. The Briefing Chart must not contain proprietary data. **IMPORTANT** – Completing the Cover Sheets, Cost Proposal, and uploading the Technical Proposal and mandatory Briefing Chart is not sufficient. You must submit your proposal within the electronic submission system by first clicking the Submit Proposal link. Once the “Submit Proposal” confirmation page is displayed,

review it to ensure all forms have been completed. It is recommended that you print this page for your records. Finally, you must click the "Submit Proposal" button to submit your proposal. The system will automatically send a Submission Confirmation email to the email address of the user submitting the Proposal, and the email addresses of the PI and the POC specified on Cover Sheet B. If you do not receive an email, contact the Help Desk as instructed in Section 1.6 of this Solicitation.

- e. The Technical Proposal adheres to the topic description requirements and the Cost Proposal adheres to the funding thresholds specified in this Solicitation. Both the Technical Proposal and the Cost Proposal adhere to the requirements of this Solicitation.
- f. The Technical Abstract entered in Cover Sheet B, limited to 250 words, contains NO proprietary information. The Technical Abstract must summarize the implications of the approach and the anticipated results of both Phase I and Phase II, including an assessment of technology readiness levels (TRLs) at the beginning and end of the resultant Phase I contract. In the event of an award, this Technical Abstract will be published/posted at <https://sbir2.st.dhs.gov>.
- g. Mark proprietary information within the Technical Proposal as instructed in Section 5.6 of this Solicitation.
- h. The content in the Technical Proposal must include all of the items in Section 3.5(b) of this Solicitation in the order specified. The Phase I option is addressed, if applicable.
- i. The header on each page of your Technical Proposal must contain your company name, topic number, and proposal number. (The header may be included in the one-inch margins.)
- j. Limit your proposal to the page limitations established for Phase I and/or Phase II proposals.
- k. Use a type size no smaller than a 12-point font on standard 8 1/2 " X 11" paper with one (1) inch margins.
- l. The Technical Proposal must not be in two-column or more format. The Technical Proposal must be submitted in Portable Document Format (PDF) format. Do not upload security/password protected files. The proposer is responsible for performing a virus check on each submitted technical proposal. As a standard part of entering the proposal into the processing system, DHS will scan each electronic technical proposal for viruses. The detection, by DHS, of a virus on any electronically submitted technical proposal, may cause rejection of the proposal.

### ***3.3 Proprietary Information***

If information is provided that the proposer believes constitutes a trade secret, proprietary commercial or financial information, or personal information or data, it will be treated in confidence to the extent permitted by law, provided that it is clearly marked in accordance with Section 5.6 of this Solicitation. The mandatory Briefing Chart must not contain proprietary data.



### 3.4 *Limitations on Length of Proposal*

This Solicitation is designed to reduce the investment of time and cost to small business concerns in preparing a formal proposal. Those who wish to respond must submit a direct, concise, and informative research or research and development proposal of no more than the page limitations established for Phase I and/or Phase II Proposals, including proposal cover sheets and cost proposal. Promotional and non-project related discussion is discouraged and will not be evaluated if submitted. The space allocated to each section will depend on the problem chosen and the principal investigator's approach. In the interest of fairness, pages in excess of the Phase I, 25-page limitation (and Phase II, 50-page limitation) (including attachments, appendices, or references) will not be considered for review or award.

### 3.5 *Phase I Proposal Format*

*The Phase I Proposal length is limited to 25 pages.*

- a. **Proposal Cover Sheets.** Prepare the Proposal Cover Sheets (A and B) (as provided on the electronic submission website <https://sbir2.st.dhs.gov>), including a brief technical abstract of the proposed R&D project and a discussion of anticipated benefits and potential commercial applications. Cover Sheet A will count as one page towards the 25 page limit of your proposal no matter how it prints out. Cover Sheet B counts as one page towards the 25 page limit no matter how it prints out. The Cost Proposal counts as one page towards the 25 page limit no matter how it prints out. The Technical Proposal is not to exceed 22 pages, including the table of contents and all graphics. The mandatory one-page Briefing Chart is not included in the 25 page limit and must not contain proprietary data. If your proposal is selected for award, the technical abstract (limited to 250 words) will be publicly released/posted on the DHS SBIR website and the Small Business Administration's TechNet website; therefore, do not include proprietary or classified information in the Technical Abstract section of Cover Sheet B.
- b. **Technical Proposal.** Create a single file that covers the following items in the order given below. Begin your Technical Proposal on Page 3 (since the Cover Sheets are pages 1 and 2) and put your company name, topic number, and proposal number in the header of each page. (The header may be included in the one-inch margins.) The Technical Proposal must not be longer than 22 pages, since the Cover Sheets count as two pages and the Cost Proposal counts as one page (no matter how they print out). The Technical Proposal file must be in Portable Document Format (PDF) for evaluation purposes. Perform a virus check before uploading the Technical Proposal file. If a virus is detected, it may cause rejection of the proposal. The Technical Proposal must be a single file, including graphics and table of contents (if included). Do not lock, password protect, or encrypt the file you upload.
  - (1) **Identification and Significance of the Problem or Opportunity.** Succinctly define the specific technical problem or opportunity addressed; the proposed innovation; the relevance and significance of the proposed innovation to a need(s) within the topic description; the proposed innovation relative to the state of the art; and the importance of the work proposed.

- (2) **Phase I Technical Objectives.** State the specific objectives of the Phase I R/R&D effort including the technical questions that must be answered to determine the feasibility of the proposed innovation/approach.
- (3) **Phase I Work Plan.** Provide an explicit, detailed description of the Phase I approach. The Plan must indicate what is planned, how, when, and where the work will be carried out, a schedule of major events, the final product to be delivered, and the completion date of the effort. The Phase I effort must determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task must be discussed explicitly and in detail. Task descriptions, schedules, resource allocations, estimated task hours for each key personnel and planned accomplishments, including project milestones, must be included. This section must be a substantial portion of the total proposal.
- (4) **Related Work.** Describe significant (current and/or previous) activities directly related to the proposed effort, including any conducted by the principal investigator, the proposing small business, consultants, or others. Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. The proposal must persuade reviewers of the proposer's awareness of the state-of-the-art in the specific topic. Describe previous work not directly related to the proposed effort but similar. Provide the following: (a) short description, (b) client for which work was performed (including individual to be contacted and phone number), and (c) date of completion.
- (5) **Relationship with Future Research or Research and Development.**
  - (a) State the anticipated results of the proposed approach, assuming project success through Phase I and Phase II.
  - (b) Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort, application and commercialization efforts (Phase III).
- (6) **Commercialization Strategy.** Describe, in approximately two (2) pages, your company's strategy for commercializing this technology in DHS, other Federal Agencies, and/or private sector markets. Provide specific information on the market need the technology will address and the size of the market. Also, include a schedule showing the quantitative commercialization results from this SBIR project that your company expects to achieve and when (i.e., amount of additional investment, sales revenue, etc.).
- (7) **Key Personnel.** Identify key personnel who will be involved in the Phase I effort including information on directly related education and experience. A concise resume of the principal investigator, including a list of relevant publications (if any), must be included (please do not include Privacy Act Information in the resume). All resumes will count toward the 25-page limitation. Identify any non-U.S. citizen(s) that you expect to be involved on this project (including direct employees, subcontractors and consultants), their country of origin, type of visa or work permit under which they are performing, and an explanation of their

anticipated level of involvement on this project. Please do not include Privacy Act Information. You may be asked to provide additional information during negotiations in order to verify the non-U.S. citizen's eligibility to participate on an SBIR contract. Supplemental information provided in response to this paragraph will be protected in accordance with Privacy Act (5 U.S.C. 552(a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)).

- (8) **Facilities/Equipment.** Provide sufficient information to allow the evaluators to assess the ability of the proposer to carry out the proposed Phase I and projected Phase II and Phase III activities. Describe available instrumentation and physical facilities necessary to carry out the Phase I effort. Items of equipment to be purchased (as detailed in the Cost Proposal) must be justified under this section. Also state whether or not the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state (name), and local governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.

Note: Government wide SBIR policies restrict the use of any SBIR funds for the use of Government equipment and facilities. This does not preclude a small business from utilizing a Government facility or Government equipment, but any charges for such use may not be paid for with SBIR funds (Small Business Administration (SBA) Policy Directive, Section 9(f)(3)). DHS may not and cannot fund the use of the Federal facility or personnel for the SBIR project with non-SBIR funds. In rare and unique circumstances, SBA may issue a waiver to this provision after review of an agency's written justification. DHS cannot guarantee that a waiver from this policy can be obtained from SBA. The following information is required for consideration of a waiver:

- (a) An explanation of why the SBIR research project requires the use of the Federal facility or personnel, including data that verifies the absence of non-federal facilities or personnel capable of supporting the research effort.
- (b) The concurrence of the small business' chief business official to use the Federal facility or personnel.

If a proposed project or product demonstration requires the use of unique Government facilities or equipment to be funded by the SBIR program, then the proposer must provide a) a letter from the small business company official explaining why the SBIR research project requires the use of the Federal facility or personnel, including data that verifies the absence of non-Federal facilities or personnel capable of supporting the research effort, and b) a statement signed by the appropriate Government official at the facility, verifying that it will be available for the required effort. The proposal should also include relevant information on the funding source(s) private, internal, or other Government. Failure to provide this explanation and the site manager's written authorization of use may invalidate any proposal selection. If the proposer proposes the use of

SBIR funds for Government equipment or facilities, this explanation will be provided to the SBA during the waiver process.

- (9) **Subcontractors/Consultants.** Involvement of a university or other subcontractors or consultants in the project may be appropriate (see Section 2.7 of this Solicitation). If such involvement is intended, it must be described in detail and identified in the Cost Proposal. A minimum of two-thirds of the research and/or analytical work in Phase I, as measured by direct and indirect costs, must be carried out by the proposing small business concern. No portion of an SBIR award may be subcontracted back to any Federal Government Agency or Federally Funded Research and Development Center (FFRDC). The Small Business Administration (SBA) may issue a case-by-case waiver to this provision after review of the DHS written justification that includes the following information: (a) an explanation of why the SBIR research project requires the use of the Federal/FFRDC facility or personnel, including data that verifies the absence of non-federal facilities or personnel capable of supporting the research effort; (b) the concurrence of the small business concern's chief business official to use the Federal/ FFRDC facility or personnel. Award is contingent on DHS obtaining a waiver from the SBA.
- (10) **Prior, Current, or Pending Support of Similar Proposals or Awards.** Warning -- While it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work (see Section 2.9 of this Solicitation) for consideration under numerous federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

If a proposal submitted in response to this Solicitation is substantially the same as another proposal that has been funded, is now being funded, will be submitted to other agencies for funding consideration, or is pending with DHS or another Federal Agency, the proposer must so indicate on the Proposal Cover Sheet and provide the following information:

- (a) Name and address of the Federal Agency(s) to which a proposal was submitted, will be submitted, or from which an award is expected or has been received.
- (b) Date of proposal submission or date of award.
- (c) Title of proposal.
- (d) Name and title of principal investigator for each proposal submitted or award received.
- (e) Title, number, and date of Solicitation(s) under which the proposal was submitted, will be submitted, or under which award is expected or has been received.
- (f) If award was received, state contract number.

- (g) Specify the applicable topics for each SBIR Proposal submitted or award received.

**Note: If Section 3.5.b (10) of this Solicitation does not apply, state in the Proposal "No prior, current, or pending support for proposed work."**

- (11) **Phase I Option.** A Phase I Option may be exercised to bridge the funding gap between the Phase I and Phase II project. The Phase I Option, if exercised, will only be done so (at the Government's discretion and subject to the availability of funds) to fund interim Phase I activities for companies that are selected for Phase II, while a Phase II contract is being negotiated. Proposers are encouraged to describe, within the 25 page limit, an option which furthers the research or research and development effort, and should describe appropriate initial Phase II activities that may lead to the successful demonstration of a product or technology. The Phase I Option covers activities over a period of up to four months. The Phase I Option must be included as part of the Phase I proposal, if the proposer would like to be considered for interim funding.

**Note:** If Section 3.5.b.(11) of this Solicitation does not apply, i.e., the proposer is not submitting a Phase I Option for consideration, the proposer recognizes that the proposer will not be eligible for interim funding should it be selected for Phase II.

c. **Cost Proposal.**

**Phase I Cost Proposal.** Proposers that participate in this Solicitation must complete the Phase I Cost Proposal, not to exceed the maximum dollar amount for the base Phase I effort, on line via the electronic submission website at <https://sbir2.st.dhs.gov>. For the Science and Technology (S&T) topics in this Solicitation, the maximum base Phase I effort is \$100,000. (**Note:** while you are logged in, there is a session timeout running. If you are inactive for more than 20 minutes (e.g., no keystrokes or mouse clicks on the page), you will automatically be logged out.) You may want to peruse the Cost Breakdown Guidance, found at <https://sbir2.st.dhs.gov>, click on "Reference Materials", prior to initiating your Cost Proposal to become familiar with the information that you must provide. Please note that some items in the [Cost Breakdown Guidance](#) may not apply to the proposed project. If such is the case, there is no need to provide information on each and every item. What matters is that enough information be provided to allow DHS to understand how the proposer plans to use the requested funds if the contract is awarded.

- (1) List all key personnel by name as well as by number of hours dedicated to the project as direct labor.
- (2) Special tooling and test equipment and material cost may be included under Phases I and II. The inclusion of equipment and material will be carefully reviewed relative to need and appropriateness for the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting Officer, be advantageous to the Government and should be related directly to the specific topic. These may include such items as innovative instrumentation and/or automatic test equipment. Title to property furnished by the Government or acquired with Government funds

will be vested with DHS unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment by DHS.

- (3) Cost for travel funds must be justified and related to the needs of the project. DHS requests that you budget, as a minimum, travel to attend a one day project kickoff meeting in the Washington DC metropolitan area. The DHS SBIR Program Office holds kick-off meetings with all successful proposers approximately two weeks after contract award. Reasonable travel costs may include this one day meeting, as well as another one day meeting to present your project findings to your Phase I Program Manager. Travel will typically be performed at the beginning of your Phase I award or at the conclusion of the Phase I effort.

If applicable, a brief explanation of cost estimates for equipment, materials, and consultants or subcontractors can be included in the Cost Proposal. However, when a proposal is selected for award, the proposer must be prepared to submit further documentation to the Contracting Officer to substantiate costs (e.g., a detailed explanation of cost estimates for equipment, materials, and consultants or subcontractors).

If additional Cost Proposal information for the base Phase I effort is required, it may be placed at the end of your Technical Proposal (and included in the page count limitation). For more information about cost proposals and accounting standards, see the DCAA publication called "Information for Contractors" available at <http://www.dcaa.mil>.

Cost sharing is permitted for proposals under this Solicitation; however, cost sharing will not be considered nor will it be an evaluation factor in the consideration of a Phase I proposal.

### **3.6 *Page Numbering***

Number all pages of your proposal consecutively. The Cover Sheets (generated by the system from data entered into Cover Sheets A and B) are pages 1 and 2. The Technical Proposal begins on page 3 and continues through not more than page 24. The Cost Proposal (generated by the system from data entered by the proposer) is page 25 (no matter how it prints out). The Cost Proposal for the option effort is not included in the page count of the Technical Proposal. The mandatory Briefing Chart is not included in the Technical Proposal page count.

### **3.7 *Prior Awards Addendum***

If the proposer has received more than 15 Phase II awards in the prior five fiscal years, provide the name of the awarding agency, date of award, Phase I funding agreement number, Phase I award amount, and topic title. Also provide the award amount and date of previous Phase II funding, as well as the commercialization status for each prior Phase II award. The Prior Awards addendum is not included in the 25-page limit, but must be included in and uploaded with the Technical Proposal. The content in the addendum should be limited to the information requested in this section.

### **3.8 *Phase III Awards Resulting from DHS SBIR Awards Addendum***

If the proposer has received any Phase III awards resulting from work on any DHS SBIR award, provide related Phase I and/or Phase II contract numbers, name of the Phase III awarding agency, date of the award, funding agreement number, award amount, project title, period of performance and current commercialization status for each award. The Phase III Awards Addendum is not included in the 25-page limit, but must be included and uploaded with the Technical Proposal. The content in the addendum should be limited to the information requested in this section.

### **3.9 *Phase II Proposal Invitation***

This Solicitation is for Phase I only. A Phase II Proposal can be submitted only by a Phase I awardee and only in response to a request from the Contracting Officer. DHS S&T Program Managers for the applicable topic may recommend that Phase I participants be invited to submit Phase II Proposals based upon site visits, the monthly and/or final reports, and progress made towards the accomplishment of Phase I technical objectives and plans for Phase II. Not all Phase I participants will be invited to submit a Phase II Proposal. The number of Phase II Proposal invitations will depend upon the number of Phase I awards made in the topic, the availability of funding, and the quality of the Phase I research. DHS reserves the right to invite all, some, or none of the Phase I awardees in a topic to submit Phase II proposals.

Based on the recommendation from the cognizant topic program manager, the DHS SBIR Program Office may recommend to a Contracting Officer that a Phase I contractor be invited to submit a Phase II Proposal, beginning no earlier than two thirds (2/3) into the Phase I period of performance (DHS SBIR Jump Start feature). (Example: four months into a six month period of performance.) While some Phase II invitations will be made prior to completion of the Phase I period of performance, other Phase II invitations will be extended at the end of the period of performance. DHS will evaluate each Phase II Proposal when received in accordance with the evaluation criteria provided in Section 4.3, and if the proposal is deemed to be highly rated, will enter into negotiations for award, subject to the availability of funds. The goal is to use the SBIR Jump Start feature to accelerate the technology development and reduce, or eliminate, the gap between the Phase I and Phase II efforts.

An invitation to submit a Phase II proposal is the first step of the Phase II award process, which consists of the invitation, submission of a Phase II proposal in accordance with the Phase II proposal instructions, including the date and time set for receipt of proposal(s), evaluation of that proposal against the Phase II evaluation criteria, selection of Phase II proposals for award, and any negotiations leading to the award of a Phase II contract to those otherwise successful Phase II proposals. The Phase II invitation to submit a proposal does not commit the Government to select or make a Phase II award to the invitee.

### **3.10 *Phase II Proposal Format***

As stated previously, a separate solicitation will not be issued for Phase II. These proposals instructions are provided as information only for those organizations who may receive a Phase I award and may be invited to submit a Phase II proposal. Phase II proposal is limited to 50 pages, using a type size no smaller than a 12-point font on standard 8 ½ X 11” paper with one (1) inch

margins. Two-column or more format is not allowed. Invited Phase II Proposals shall be submitted via the electronic submission website at <https://sbir2.st.dhs.gov>. Paper submissions and proposals received by any other means will not be accepted, evaluated or considered for award (unless directed to otherwise).

- a. **Each Phase II base proposal**, not to exceed \$750,000, must contain Proposal Cover Sheets, a Technical Proposal, a Cost Proposal and a Company Commercialization report, if applicable. See Section 3.10 (d) of this Solicitation. In addition, each Phase II proposal must contain approximately two pages of a Commercialization Strategy in the Technical Proposal.
- b. **Commercialization Strategy.** The Commercialization Strategy must address the following questions:
  - (1) What is the first product that this technology will go into?
  - (2) Who will be your customers, and what is your estimate of the market size?
  - (3) How much money will you need to bring the technology to market, and how will you raise that money?
  - (4) Does your company contain marketing expertise and, if not, how do you intend to bring that expertise into the company?
  - (5) Who are your competitors, and what is your price and/or quality advantage over your competitors?

The Commercialization Strategy must also include a schedule showing the quantitative results from the Phase II project that your company expects to report in its Company Commercialization Report Updates one year after the start of the Phase II, at the completion of Phase II, and after the completion of Phase II (i.e., amount of additional investment, sales revenue, etc. – see Sections 4.4 and 5.4 of this Solicitation).

- c. **Cost Match.** Proposers that request Phase II Cost Match funds have an opportunity in the Commercialization Strategy to present the compelling value of the proposed Phase II project. The Commercialization Strategy should provide qualitative and quantitative information directly related to the Cost Matching; explaining the improved time interval or acceleration between the completion of Phase II work and the of launching of the innovative products, processes, or services into the marketplace. Additional Phase II Cost Match guidance can be found in Section 3.11 of this Solicitation.
- d. **Company Commercialization Report.** For those concerns that have received prior SBIR Phase II funding, a succinct Commercialization Report must be included with the Proposal. The Company Commercialization Report is submitted online with the Phase II Technical Proposal (append it to the Phase II Technical Proposal; the Company Commercialization Report is not included in the Phase II Technical Proposal page count). The following are examples of company commercialization data expected in the Commercialization Report. Additional Commercialization Reporting requirements and Commercialization Update requirements can be found in Sections 4.4 and 5.4 of this Solicitation.
  - (1) Any business concern or subsidiary established for the commercial application of a product or service for which an SBIR award is made.



- (2) Revenue from the sale of new products or services resulting from the research conducted under each Phase II award;
- (3) Additional investment from any source, other than Phase I or Phase II awards, to further the research and development and/or commercialization conducted under each Phase II award.
- (4) Whether the Phase II technology has been used in a fielded DHS system or acquisition program, and, if so, which system or program.
- (5) The number of patents resulting from the contractor's participation in the SBIR Program.
- (6) Whether the company has completed an initial public offering (IPO) of stock resulting, in part, from the Phase II Project.

Update the information in the Company Commercialization Report for any prior Phase II award received by the company. The company may apportion sales or additional investment information relating to more than one Phase II award among those awards, if it notes the apportionment for each award.

- e. **Phase II Option.** For Phase II submissions against the Science and Technology (S&T) topics listed in this Solicitation, a Phase II Option (not to exceed \$250,000) may be exercised at the DHS' discretion to continue funding Phase II activities that will further mature the technology for insertion into a larger DHS Program or DHS Acquisition Program. The Phase II Option covers activities over a period of up to 24 months and should describe Phase II activities that may lead to the successful demonstration of a product or technology. The Phase II Option must be included within the 50-page limit for the Phase II proposal if the proposer would like to be considered for the additional Phase II funding. If a Phase II Option is proposed, it must not exceed the maximum dollar amount of \$250,000. The Phase II Option Cost Proposal (if applicable) must be placed at the end of the Technical Proposal and uploaded with the Technical Proposal. The Phase II Option Cost Proposal is not included in the 50 page count limitation. Phase II costs and Phase II Option costs must be shown separately. There is no specific format for the Phase II Option Cost Proposal, but it must include all applicable categories (see the Phase I Cost Proposal for information to provide). For reference, see the [Cost Breakdown Guidance](https://sbir.st.dhs.gov) at <https://sbir.st.dhs.gov> and click on "Reference Materials" for the type of information that may need to be provided. Please note that some items in the [Cost Breakdown Guidance](https://sbir.st.dhs.gov) may not apply to the option effort. If such is the case, there is no need to provide information on each and every item. What matters is that enough information be provided to allow DHS to understand how the proposer plans to use the requested funds. If selected, the government may elect not to include the Phase II option in the negotiated contract.

### 3.11 *SBIR Phase II Cost Match*

- a. **General Provisions of the DHS SBIR Cost Match Feature.** The DHS SBIR Program includes a Cost Match feature for SBIR projects that attract matching cash from an outside investor for the Phase II SBIR effort. The purpose is to focus SBIR funding on those projects that are most likely to be developed into viable new products that DHS

and others will buy and that will thereby make a major contribution to homeland security and/or economic capabilities. The cost match can occur at the time of award, or during the Phase II period of performance.

Outside investors may include such entities as another company, a venture capital firm, an individual investor, or a non-SBIR government program; they do not include the owners of the small business, their family members, and/or affiliates of the small business. In order to be considered for DHS S&T SBIR cost match, the outside investors must commit a minimum of \$100,000 up to a maximum of \$500,000. DHS will, at its option, match up to 50% of funds received. The SBIR Phase II basic awards will be made for a maximum of \$750,000 and the cost match award will be made for a maximum of \$250,000. The total cumulative SBIR funding for the Phase II award plus DHS cost match cannot exceed \$1,000,000 (or \$1,250,000 if the Phase II option is exercised). Outside investors may contribute funding above the \$500,000 cost match ceiling, however, DHS SBIR will only match 50% up to the \$250,000 maximum.

The additional work proposed should be an expansion of the technical work being performed in the Phase II project and must fall within the general scope of the present Phase II project.

- b. **How to Qualify for the SBIR Phase II Cost Match.** To qualify for the SBIR Cost Match feature, a company must be a Phase I awardee submitting a Phase II proposal or a Phase II awardee. The company is encouraged to discuss the application with their SBIR Program Manager and the DHS SBIR Program Director. The awardee is to follow Phase II Proposal instructions and guidance, and also provide the cost match documentation and request for matched funding.
- (1) A Phase II Proposal must be submitted electronically on the DHS Electronic Submission website (<https://sbir2.st.dhs.gov>).
  - (2) The proposing company must:
    - (a) State that the outside investor will match funding in the SBIR Phase II proposal, in cash, and state the amount of the outside investment, contingent on the company's selection for Phase II award.
    - (b) Certify that the outside funding proposed in the application qualifies as a Cost Match investment, and the investor qualifies as an "outside investor," as defined above.
    - (c) Provide a brief statement (less than one page) describing that portion of the effort that the investor will fund. The investor's funds may pay for additional research and development on the company's SBIR project or, alternatively, they may pay for other activities not included in the Phase II Statement of Work, provided these activities further the development and/or commercialization of the technology (e.g., marketing).
    - (d) Provide qualitative and quantitative information reflecting any additional Period of Performance to complete the new or expanded effort. Provide a concise Statement of Work for the Cost Match effort (less than four pages) and detailed Cost Proposal (less than one page).

- (3) The outside investor must provide:
- (a) A brief statement describing the investor's experience in evaluating companies' abilities to successfully commercialize technology, the investor's assessment of the market for this particular SBIR technology, and of the ability of the company to bring this technology to market.
  - (b) A letter of commitment, signed by the investor(s), containing a commitment to provide a minimum of \$100,000 or up to \$500,000 Phase II Cost Match funding, in cash, contingent on the company's selection or performance of the Phase II award. An investor may contribute above the \$500,000 Phase II Cost Match; however Government matching funds will not exceed 50% up to the \$250,000 maximum.
- (4) The Transfer of Investor Funding:

The company shall certify within 60 days that the entire amount of the matching funds from the outside investor has been transferred to the company. The Certification consists of a letter, signed by both the company and its outside investor, stating that "\$\_\_\_\_\_ in cash has been transferred to our company from our outside investor in accord with the SBIR Cost Match procedures." The letter must be sent to a DHS appointed Contracting Officer, along with a copy of the company's bank statement showing the funds have been deposited. The transfer of investor funds from another Government agency will be coordinated with the DHS SBIR designated Contracting Officer. **IMPORTANT:** If the Contracting Officer does not receive this certification showing the transfer of funds within 60 days, the company will be ineligible to compete for Phase II Cost Match funding, unless a specific written exception is granted by the DHS SBIR Program Director.

Failure to meet these conditions in their entirety and within the time frames indicated may disqualify a company from participation in the SBIR Cost Match. DHS maintains the right to award some, all, or none of the Phase II Cost Match requests. Phase II Cost Match funding is contingent upon the number of applications, availability of funds, and proper certification of investor funds.

**c. Additional Reporting Requirement.**

In the company's final Phase II Progress Report, a brief accounting must be included (in the company's own format or format that has been provided by the DHS PM) of how the investor's funds were expended to support the project.

**3.12 False Statements**

Knowingly and willfully making any false, fictitious, or fraudulent statements or representations, may be a felony under the False Statement Act (18 U.S.C. §1001), punishable by a fine of up to \$10,000, up to five years in prison, or both.

**4.0 METHOD OF SELECTION AND EVALUATION CRITERIA**

#### 4.1 *Introduction*

SBIR Proposals will be processed and made available to the appropriate technical program manager within DHS for evaluation and action. DHS Program Managers may seek technical advice from Federal Government employees and/or from technical and business experts who may be non-Federal Government employees. Non-government personnel will not participate in the final rating or ranking of offerors' proposals. In all cases, evaluators and advisors will be required to sign Certificates of Non-Disclosure and Statements of Financial Interest and will receive training regarding Procurement Integrity and Conduct required during the Source Selection process. Non-Government personnel (e.g., DHS support contractors) may be used to handle the administrative functions for the SBIR Program. The support contractors will be bound by appropriate non-disclosure agreements to protect proprietary and source-selection information. They will not be permitted to release any source selection information to third parties, including others in their organization. DHS will select proposals for funding based on technical merit and the evaluation criteria contained in this Solicitation document. As funding is limited, DHS reserves the right to select and fund only those proposals considered to be highly rated in overall technical quality and highly relevant to the DHS mission. As a result, DHS may fund more than one proposal in a specific topic area if the technical quality of the proposal(s) is highly rated, or it may not fund any proposals in a topic area.

Phase I SBIR proposals will be evaluated on a competitive basis and will be considered to be binding for six (6) months from the date of closing of this Solicitation unless the proposer states otherwise. If selection has not been made prior to the proposal's expiration date, proposers may be asked to extend their proposal for an additional period of time. Proposals meeting stated Solicitation requirements will be evaluated by scientists and/or engineers knowledgeable in the topic area. A proposal that meets the goals of a solicitation topic but does not use the exact approach specified in the topic will be considered relevant. (Prospective proposers should contact the DHS SBIR Program as described in Section 1.6 of this Solicitation to determine whether submission of such a proposal would be useful.)

Proposals will be evaluated using the criteria listed in Section 4.2 of this Solicitation (and Section 4.3 of this Solicitation for Phase II). Final decisions will be made based upon these criteria and consideration of other factors including possible duplication of other work and program balance. In the evaluation and handling of proposals, every effort will be made to protect the confidentiality of the proposal and any evaluations. There is no commitment by DHS to make any awards on any topic, to make a specific number of awards, or, to be liable for any costs expended by the proposer prior to award of any contract.

For proposals that have been selected for contract award, a Contracting Officer will prepare a contract to be signed by both parties before work begins. Any negotiations that may be necessary will be conducted between the proposer and the Contracting Officer. It should be noted that only a duly appointed Contracting Officer has the authority to enter into a contract on behalf of the U.S. Government.

Prior to receiving a contract award, the proposer must be registered in the Central Contractor Registration (CCR) database. For information regarding registration, call 1-888-227-2423 or visit <http://www.ccr.gov>.

Phase II proposals will be subject to a technical review process similar to Phase I. Final decisions will be made by DHS based upon the scientific and technical evaluations and other factors,

including a commitment for Phase III follow-on funding, the possible duplication with other research or research and development, program balance, budget limitations, and the potential of a successful Phase II effort leading to a product of continuing interest to DHS. DHS is not obligated to make any awards under Phase II, and all awards are subject to the availability of funds. DHS is not liable for any costs expended by the proposer prior to award of a contract.

Upon written request and after final award decisions have been announced, evaluation results (in the form of the consensus review) will be provided to unsuccessful proposers on their Phase I and Phase II Proposals (see Section 6.4 of this Solicitation).

Restrictive notices notwithstanding, Phase I and Phase II proposals may be handled by administrative support personnel, who are bound by the terms of signed Non-Disclosure Agreements.

Phase I and Phase II proposals will be evaluated for strengths, weaknesses, and deficiencies using the following definitions:

- a. **Strength** - An aspect of a proposal that benefits the Government in terms of the quality of the Proposer's performance, cost effectiveness, or reduced risk and is expected to contribute to successful contract performance.
- b. **Weakness** - A flaw in the proposal that increases the risk of unsuccessful contract performance. A "significant weakness" in the proposal is a flaw that appreciably increases the risk of unsuccessful contract performance.
- c. **Deficiency** - A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

The following adjectival ratings will be used in the evaluation of Phase I and Phase II proposals:

**Excellent:** A convincing demonstration that all SBIR FY 12.1 requirements are met or exceeded by the proposer's display of the highest levels of innovation, technical competence, personnel expertise, and potential for commercialization. The proposal fully and completely meets the expectations and sets forth plans and approaches that show a high probability of meeting the requirements of the topic description. Proposals in this category are strongly recommended for funding. Has strengths that will significantly benefit the Government. Has no weaknesses.

**Very Good:** Approaches and planning considerations demonstrate that the proposer is able to interpret goals and project them clearly into concise plans. Proposer demonstrates an awareness of the subtle interactions influencing system design; technical and planning efforts show strong promise of meeting the requirements of the topic description. Proposals in this category are recommended for funding. Has one or more strengths that will benefit the Government. Has no significant weaknesses.

**Good:** Plans and approaches are provided to the extent requested, and key or pivotal points have been satisfactorily addressed in the proposal. The proposer has presented an orderly plan to meet the stated goals, but the proposal does not necessarily demonstrate any exceptional features, innovations, or originality. The technical analyses satisfactorily meet requirements and are technically correct. Funding of proposals in this category is dependent on availability of funds. Few strengths. Has a few weaknesses.

**Fair:** The proposal indicates a shallow understanding of the problem. The technical analyses only marginally meets the goals, and the proposer fails to demonstrate a reasonable probability of successfully performing the desired task or commercializing the resulting product. Funding of proposals in this category is dependent on availability of funds.

**Unacceptable:** Does not meet the SBIR FY 12.1 criteria topic description requirements. Not recommended for funding.

#### 4.2 *Evaluation Criteria - Phase I*

DHS plans to select for award those proposals offering the best value to the Government considering the following factors in decreasing order of importance:

- a. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.
- b. The qualifications of the proposed principal/key investigators, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability to commercialize the results.
- c. The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization as assessed utilizing the criteria in Section 4.4 of this Solicitation.
- d. The cost realism and reasonableness of the Cost Proposal. The Cost Proposal will not be adjectively graded.

Members of the evaluation team may presume that the technical approach provided by the proposer serves as a rationale for the labor mix and labor hours used.

Technical reviewers will base their conclusions only on information contained in the proposal. It cannot be assumed that reviewers are acquainted with the proposer or key individuals or any referenced experiments. Relevant supporting data such as journal articles, literature, including Government publications, etc., should be contained or referenced in the proposal and will count towards the 25-page limit.

#### 4.3 *Evaluation Criteria – Phase II*

The Phase II proposal will be reviewed for overall merit based upon the criteria below in decreasing order of importance:

- a. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.
- b. The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization as assessed utilizing the criteria in Section 4.4 of this Solicitation.
- c. The qualifications of the proposed principal/key investigators, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability to commercialize the results.
- d. The cost realism and reasonableness of the cost proposal. The cost proposal will not be adjectively graded.

Members of the evaluation team may presume that the technical approach provided by the proposer serves as a rationale for the labor mix and labor hours used.

Phase II Proposal evaluations may include on-site evaluations of the Phase I effort by Government personnel.

#### **4.4 *Assessing Commercial Potential of Proposals***

DHS is particularly interested in the potential transition of SBIR project results to the DHS operational components and homeland security enterprise, and expects explicit discussion of a transition vision in the commercialization strategy section of the proposal. That vision should include identification of the problem, need, or requirement in the Department of Homeland Security that the SBIR project results would address; a description of how wide-spread and significant the problem, need, or requirement is; identification of the potential end-users (e.g., specific DHS operational components or members of the homeland security enterprise) who would likely use the technology; and the operational environments and potential application area(s).

Technology commercialization and transition from research or research and development activities to fielded systems within DHS is challenging. Phase I is the time to plan for and begin to transition specific activities. The small business must convey an understanding of the transition path or paths to be established during the Phase I and Phase II projects. That plan should include the Technology Readiness Level (TRL) at the start and end of the Phase II. The plan should also include a description of targeted operational environments and priority application areas for initial Phase III transition; potential Phase III transition sources; anticipated business model and identified commercial and federal partners the SBIR company has identified to support transition activities. Also include key proposed milestones anticipated during Phases I, II, or beyond Phase II that include, but are not limited to: prototype development, laboratory and systems testing, integration, testing in operational environment, and demonstrations.

The commercial potential of a Phase I or Phase II proposal will be assessed using the following criteria:

- a. The proposer's commercialization strategy (see Section 3.5.b (6) of this Solicitation) and, as discussed in that strategy:
  - (1) any commitments of additional investment in the technology during Phase II from the private sector, prime contractors, non-SBIR programs, or other sources, and
  - (2) any Phase III follow-on funding commitments; and
- b. The proposer's record of commercializing its prior SBIR Projects.

A Company Commercialization Report showing that the proposing company has no prior Phase II awards will not affect its ability to receive an award. Such a company's proposal will be evaluated for commercial potential based on its commercialization strategy in item 4.4(a) of this Solicitation, above.

#### **4.5 *DHS SBIR Commercialization Assistance Program***

In March 2011, the DHS SBIR Program Office implemented a Commercialization Assistance Program. It is comprised of three levels:

- a. Level I: website presentation of DHS priority technologies, expectations regarding end-users, requirements to move on to Phases II and III, etc. This level is open to all interested parties.
- b. Level II: two day seminar. This level is open to all DHS SBIR awardees.
- c. Level III: six month Commercial Assistance Mentoring program. This level is offered to DHS SBIR Phase II awardees.

## **5.0 CONTRACTUAL CONSIDERATIONS**

Note: Eligibility and Limitation Requirements (Section 1.3 of this Solicitation) will be enforced.

### **5.1 Phase I Awards**

- a. **Number of Phase I Awards.** The number of Phase I awards will be consistent with the Science and Technology (S&T) Directorate's budget for the S&T topics in this Solicitation in this Solicitation. The number of anticipated Phase II contracts will also be considered in determining the number of Phase I contracts to award. No Phase I contracts will be awarded until all qualified proposals (received in accordance with Section 4.2 of this Solicitation) on a specific topic have been evaluated. Proposers will be notified of selection by a DHS designated Contracting Officer. After the Phase I awards are made, proposers will be notified of non-selection, generally within four months of the close of the Solicitation. Phase I awards are posted at <https://sbir2.st.dhs.gov>.
- b. **Type of Funding Agreement.** Each Phase I proposal selected for funding will be funded under negotiated contracts and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making concerns for R/R&D work. The firm-fixed-price type contract will be used for all Phase I awards.
- c. **Average Dollar Value of Awards.** Phase I awards made to small businesses as a result of this DHS SBIR solicitation will typically be for a period generally not to exceed six months and up to \$100,000 for S&T awards. The Phase I option, if exercised for the S&T projects that result from this Solicitation, will typically be for a period of up to four months and will not exceed \$50,000 (subject to negotiation). Public Law 102-564, as amended by the 25 March 2010 Federal Register publication in accordance with the Small Business Act 15 U.S.C. 638(j)(3), allows agencies to make Phase I awards up to \$150,000 without justification.
- d. **Timing of Phase I Awards.** The anticipated time between the date that this Solicitation closes and the award of the Phase I contract is approximately four (4) months. Phase I award information is posted on the website generally four (4) month after the close of the solicitation.

### **5.2 Phase II Awards**

- a. **Number of Phase II Awards.** The number of Phase II awards will depend upon the results of the Phase I efforts and the availability of funds. DHS anticipates that approximately 30 percent of its Phase I awards will result in Phase II projects. This is



merely an advisory estimate and DHS reserves the right and discretion not to award any or to award less than or more than this percentage for each topic area.

- b. **Type of Funding Agreements.** Each Phase II proposal selected for an award will be funded under a negotiated contract and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making concerns for R/R&D work. The firm-fixed price acquisition vehicle or the cost-plus-fixed-fee acquisition vehicle may be used for the Phase II awards.
- c. **Average Dollar Value and Duration of Awards.** Phase II awards will typically cover a period generally not to exceed \$750,000 for S&T SBIR projects, subject to negotiation. The duration of the award is typically 24 months (subject to negotiation). The Phase II option, if exercised for S&T projects that result from the topics in this Solicitation, will generally not exceed \$250,000. PL 102-564, as amended by the 25 March 2010 Federal Register publication in accordance with the Small Business Act 15 U.S.C. 638(j)(3), states that the Phase II awards may be up to \$1,000,000 each without justification.
- d. **Timing of Phase II Awards.** Phase II awards will be made incrementally, as quickly as possible, to maintain the momentum of the Phase I effort. The Phase II proposal invitation process is an attempt to identify expeditiously those Phase I awardees deserving of Phase II awards. DHS reserves the right to evaluate individual Phase II proposals when received and make Phase II proposal invitations incrementally, to some, all, or none of the Phase I participants. Phase II contracts are typically awarded within 90 – 120 days after selection, assuming the offeror has an adequate accounting system. (Reference Section 5.12(i).)

### 5.3 *Phase I Reports*

- a. **Content.** A Final Report is required for each Phase I project. An interim/draft final report is required if a Phase I option is exercised. The due date(s) will be stipulated in the contract. These reports shall be submitted as stipulated in the contract. The Final Report must contain in detail the project objectives, work performed, results obtained, and assessments of technical merit and feasibility. The Final Report must include a single-space final project summary as the first page, identifying the purpose of the research/research and development effort. The final project summary must describe the findings and results, including the degree to which the Phase I objectives were achieved, and whether the results justify Phase II continuation. The potential applications of the project results in Phase III either for DHS or commercial purposes must also be described. The final project summary must not include proprietary information, and may be released for DHS publication. In addition to the Final Report, Monthly Status Reports and Progress Reports will be required by DHS. The format for these reports will be mutually agreed upon between DHS and the potential awardee prior to contract award. Please keep in mind that the Monthly Status and Progress Reports and/or Final Reports, as well as site visits as appropriate, will be used as a basis to determine progress made towards the accomplishments of Phase I technical objectives when DHS is considering its invitation of contractors to submit Phase II proposals.
- b. **Preparation.**

- (1) If desirable, information provided by the company in its Phase II proposal to report Phase I progress may also be used in the Final Report.
- (2) For each unclassified report, the company submitting the Report shall specify one of the following statements it will use:
  - (a) Approved for public release; distribution unlimited.
  - (b) Distribution authorized to U.S. Government Agencies only; contains proprietary information (SBIR Data Rights).

Note: Data developed under SBIR contract is subject to SBIR Data Rights which allow for protection under FAR 52.227-20. DHS, after reviewing the company's recommended distribution statement, has final responsibility for assigning a distribution statement.

- c. **Submission.** The company shall submit an electronic copy of the monthly reports, final report, and final briefing chart on each Phase I project in accordance with the Phase I contract and negotiated delivery schedule via the DHS website at <https://sbir2.st.dhs.gov> and click on "Awardee Portal". Submission of the monthly reports are normally every 30 days after the project start date, and the final report submission schedule will normally be within 15 days after completion of the Phase I technical effort. Contractors shall include the company name, topic number, proposal number and contract number in each report. Submission instructions will be provided in the awarded contract.

#### 5.4 *Commercialization Updates in Phase II*

If, after completion of Phase I, the contractor is awarded a Phase II contract, the contractor shall be required to periodically update the following commercialization results of the Phase II project through the website at <https://sbir2.st.dhs.gov>. Updates shall include the following:

- a. Sales revenue from new products and non-R&D services resulting from the Phase II technology;
- b. Additional investment from sources other than the federal SBIR Program in activities that further the development and/or commercialization of the Phase II technology;
- c. Whether the Phase II technology has been used in a fielded DHS system or acquisition program and, if so, which system or program;
- d. The number of patents resulting from the contractor's participation in the SBIR Program;
- e. Growth in number of firm employees; and
- f. Whether the firm has completed an initial public offering of stock (IPO) resulting, in part, from the Phase II project.

These updates on the project will be required one year after the start of Phase II, at the completion of Phase II, and subsequently when the contractor submits a new SBIR proposal to DHS. Concerns that do not submit a new proposal to DHS will be asked to provide updates on an annual basis for five (5) years after the completion of Phase II.

Company commercialization information will be treated as company sensitive information, and should be marked as such.

### **5.5 *Payment Schedule***

The specific payment schedule (including payment amounts) for each contract will be incorporated into the contract upon completion of negotiations between the Government and the successful Phase I or Phase II proposer. Successful proposers may be paid periodically as work progresses in accordance with the negotiated price and payment schedule. Phase I contracts are primarily firm-fixed-price R&D contracts, under which monthly payments may be made. Final payment will follow completion of contract performance and acceptance of all work required under the contract.

Phase II funding awards may be Cost Reimbursement type contracts. Interim payments will be permitted in accordance with the negotiated price and payment schedule. Provisions for payment of a fee or profit will be permitted. Final payment will follow completion of contract performance and acceptance of all work required under the contract. Milestone billing payments may be used by DHS in the Phase II contract awards.

### **5.6 *Release of Proposal Information***

In submitting a proposal, the proposer agrees to permit the Government to disclose publicly the information on the Proposal Cover Sheets (A and B). Other proposal data is considered to be the property of the proposer, and DHS will protect it from public disclosure to the extent permitted by law including the Freedom of Information Act. In accordance with the Small Business Administration's SBIR Policy Directive, for each proposer that does not receive a Phase I or Phase II award the following information will be entered into the Government Tech-Net database: name, size, and location of the unsuccessful proposer; abstract of the project; and the Federal agency to which the proposal was submitted. In an effort to increase the transition of SBIR technologies and facilitate partnerships between small businesses, large integrators, and program offices, if a proposal is selected for funding, and funded, the DHS SBIR Program Office may, with the offeror's concurrence, provide the proposal to the Department of the Navy's SBIR Program Office for inclusion in its Navy SBIR/STTR search database. This tool, found at <https://www.navysbirsearch.com/>, allows users to access SBIR award information, topics, success stories and company summary reports, using an advanced concept-based searching agent. The search utilizes unique pattern-recognition technologies to draw out concepts from data. By looking for the idea or concept defined by given words, and not necessarily the words themselves, conceptual search retrieves the most relevant content. Because of this, the full proposal will be provided instead of just the publically releasable non-proprietary proposal abstract. In all cases however, the full proposal is never publically released to anyone, it is merely used to return a more comprehensive "Concept Cloud". Proposers who do not want their proposal, if funded, to be included in this database must opt out by answering "No" on the Cover Sheet.

### **5.7 *Markings of Proprietary Proposal Information***

The proposal submitted in response to this Solicitation may contain technical and other data that the proposer does not want disclosed to the public or used by the Government for any purpose other than proposal evaluation. Information contained in unsuccessful proposals will remain the

property of the proposer except for the proposal cover sheet. The Government will, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements.

If proprietary information is provided by a proposer in a proposal that constitutes a trade secret, proprietary commercial or financial information, or personal information or data affecting homeland security, it will be treated in confidence, to the extent permitted by law, provided that “yes” the “Proposal Contains Proprietary Information” is chosen on Proposal Cover Sheet A and the information contained on each page is clearly marked by the proposer with the term "PROPRIETARY" (do not use "Company Confidential"), as discussed below. Note: the Cover Sheets cannot be marked as “Proprietary”, as the technical abstract will be publically disclosed if the proposal results in contract award. By choosing “yes” the “Proposal Contains Proprietary Information” on the Proposal Cover Sheet, the following legend is assumed:

"This data, except the proposal cover sheet, shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the proposal. If a contract is awarded to the proposer as a result of or in connection with the submission of these data, the Government shall have the right to duplicate, use or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained on the pages of the proposal listed on the line below."

Use of any restrictive legend except that provided above will be unacceptable to the Government and may constitute grounds for removing the proposal from further consideration. The Government will limit dissemination of properly marked information to within official channels.

In addition to choosing “yes” for the “Proposal Contains Proprietary Information” on Cover Sheet A, each page of the proposal containing proprietary data which the proposer wishes to restrict must be marked with the following legend:

"Use or disclosure of the proposal data on lines specifically identified by asterisk (\*) are subject to the restriction on the Cover Sheet of this proposal."

If all of the information on a particular page is proprietary, the proposer should so note by including the word "PROPRIETARY" (do not use "Company Confidential") in both the header and footer on that page. Do not label the entire proposal “PROPRIETARY”. The Government assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.

In the event properly marked data contained in a proposal in response to this Solicitation is requested pursuant to the Freedom of Information Act, 5 USC §552, the proposer will be advised of such request and prior to such release of information will be requested to expeditiously submit to DHS a detailed listing of all information in the proposal which the proposer believes to be exempt from disclosure under the Act. Such action and cooperation on the part of the proposer will ensure that any information released by DHS pursuant to the Act is properly determined.

## 5.8 *Copyrights*

With prior written permission from the Contracting Officer, the awardee may copyright and publish (consistent with appropriate homeland security considerations, if any) material developed with DHS support. DHS receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgment and disclaimer statement. This is based on FAR 52.227-20, Rights in Data – SBIR Program (DEC 2007), which will be included in any resultant contract from this solicitation.

## 5.9 *Patents and Invention Reporting*

Small business concerns normally may retain the principal worldwide patent rights to any invention developed with Government support. The Government receives a royalty-free license for its use, reserves the right to require the patent holder to license others in certain limited circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically.

In accordance with FAR 52.227-11 Patent Rights – Ownership by the Contractor, SBIR awardees must disclose all subject inventions, which means any invention or discovery which is or may be patentable and is conceived or first actually reduced to practice in the performance of the contract. Once disclosed, the contractor has up to two (2) years to decide whether to elect title. If the awardee fails to do so within the 2-year time period, the Government has the right to obtain title. To the extent authorized by 35 USC 205, the Government will not make public any information disclosing the inventions, allowing the awardee the allowable time to file a patent. FAR 52.227-11 will be used regarding any inventions that are conceived or first reduced to practice under any resultant contract from this solicitation.

SBIR awardees must disclose all subject inventions to DHS within two (2) months of the inventor's report to the awardee. Awardees may report inventions to DHS through the Edison Invention Reporting Systems at [www.iedison.gov](http://www.iedison.gov). Use of the Edison System satisfies all invention reporting requirements mandated by any award.

## 5.10 *Technical Data Rights*

Rights in technical data, including software, developed under the terms of any contract resulting from proposals submitted in response to this Solicitation generally remain with the contractor, except that the Government obtains a royalty-free license to use such technical data only for Government purposes during the period commencing with contract award and ending four years after completion of the project under which the data were generated. Upon expiration of the four-year restrictive license, the Government has unlimited rights in the SBIR data. During the license period, the Government may not release or disclose SBIR data to any person other than its support services contractor except: a) for evaluation purposes; b) as expressly permitted by the contractor; or c) a use, release, or disclosure that is necessary for emergency repair or overhaul of items operated by the Government. Please refer to FAR clause 52.227-20, "Rights in Data -- SBIR Program", which will be included in any resultant contract from this solicitation.

## 5.11 *Contractor Commitments*

Upon award of a contract, the contractor shall be required to make certain legal commitments through acceptance of Government contract clauses in the Phase I Contract. The outline that

follows is illustrative of the types of provisions required by the Federal Acquisition Regulations that will be included in the Phase I contract. This is not a complete list of provisions to be included in Phase I contracts, nor does it contain specific wording of these clauses. Copies of complete general clauses and provisions will be made available prior to contract award.

- a. **Standards of Work.** Work performed under the contract must conform to high professional standards.
- b. **Inspection.** Work performed under the contract is subject to Government inspection and evaluation at all reasonable times.
- c. **Examination of Records.** The Comptroller General (or a fully authorized representative) shall have the right to examine any directly pertinent records of the contractor involving transactions related to this contract.
- d. **Default.** The Government may terminate the contract if the contractor fails to perform the work contracted or fails to make progress during performance under the contract.
- e. **Termination for Convenience.** The contract may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the contractor will be compensated for work performed and for reasonable termination costs.
- f. **Disputes.** Any dispute concerning the contract that cannot be resolved by agreement may be decided by the Contracting Officer with a right of appeal.
- g. **Contract Work Hours.** The contractor may not require an employee to work more than eight hours a day or forty hours a week unless the employee is compensated accordingly (that is, receives overtime pay).
- h. **Equal Opportunity.** The contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
- i. **Affirmative Action for Veterans.** The contractor shall not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era.
- j. **Affirmative Action for Handicapped.** The contractor shall not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.
- k. **Officials Not to Benefit.** No member of, or delegate to Congress, shall benefit from the contract.
- l. **Covenant Against Contingent Fees.** No person or agency has been employed to solicit or secure the contract upon an understanding for compensation except bona fide employees or commercial agencies maintained by the contractor for the purpose of securing business.
- m. **Gratuities.** The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.
- n. **Patent Infringement.** The contractor shall report each notice or claim of patent infringement based on the performance of the contract.

- o. **Security Requirements.** The contractor shall safeguard any classified information associated with the contracted work in accordance with applicable regulations.
- p. **American-Made Equipment and Products.** When purchasing equipment or a product under the SBIR funding agreement, purchase only American-made items whenever possible.
- q. **Publications Approval.** Government review and approval will be required prior to any dissemination or publication, except within and between the contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract.

### 5.12 *Contractor Registration*

Proposers are encouraged, but not required, to have a CAGE code and DUNS number at the time of proposal submission; however, companies must obtain these before a contract can be awarded to the company. Before a contract can be awarded to a successful proposer under this Solicitation, the proposer must be registered in the Central Contractor Registration (CCR) database and the Online Representations and Certifications Application (ORCA). The CCR allows Federal Government contractors or concerns interested in conducting business with DHS to provide basic information on business capabilities and financial information. To register, visit <http://www.ccr.gov> or call 1-888-227-2423. Follow instructions found on the CCR website on how to obtain a Commercial and Government Entry (CAGE) code and Data Universal Numbering System (DUNS) number. ORCA is a web-based system that centralizes, standardizes, and moves the collection and storing of contractor representation and certifications online. To register in ORCA, visit <http://orca.bpn.gov/>.

### 5.13 *Additional Information*

- a. **General.** This Program Solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract are controlling.
- b. **Small Business Data.** Before award of an SBIR contract, the Government may request the proposer to submit certain organizational, management, personnel, and financial information to confirm responsibility of the proposer in accordance with FAR Part 9.
- c. **Proposal Preparation Costs.** The Government is not liable for any costs expended by the proposer before award of any contract.
- d. **Government Obligations.** This Solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.
- e. **Duplication of Work.** If an award is made pursuant to a proposal submitted under this Solicitation, the contractor shall be required to certify that he or she has not previously been, nor is currently being, paid for essentially equivalent work by an agency of the Federal Government.
- f. **Unsolicited Proposals.** The SBIR Program is a competitive program. Unsolicited Proposals will not be accepted under the DHS SBIR Program in either Phase I or Phase II. Phase III awards can only be made to recipients of Phase I or Phase II awards.

- g. **Classified Proposals.** Classified proposals will not be accepted under this DHS SBIR Solicitation.
- h. **Human/Animal Testing.** Funds cannot be released or used for any portion of the project involving human/animal testing until all of the proper approvals have been obtained in accordance with applicable regulations (see Section 2.0 of this Solicitation).
- i. **Adequate Accounting System.** In order to reduce the risk to the small business and avoid potential contracting delays, it is suggested that companies interested in pursuing Phase II SBIR contracts and other contracts similar in size with DHS, have an adequate accounting system per General Accepted Accounting Principles (GAAP), Generally Accepted Government Auditing Standards (GAGAS), Federal Acquisition Regulation (FAR) and Cost Accounting Standards (CAS) in place. The accounting system will be audited by the Defense Contract Audit Agency (DCAA). DCAA's requirements and standards are available at the DCAA website [www.dcaa.mil](http://www.dcaa.mil); click on "Publications" and then on "Information for Contractors". Certified cost and pricing data may be required if Phase II or Phase III awards are over \$700,000.
- j. **Additional FAR Clauses.** FAR Clause 52.209-2, Prohibition on Contracting with Inverted Domestic Corporations – Representation, and FAR Clause 52.222-54, Employment Eligibility Verification, are incorporated into this Solicitation.

## ***6.0 SUBMISSION OF PROPOSALS***

DHS uses electronically supported businesses processes for the SBIR Program. A proposer must have Internet access (or be able to access the Internet) and an email address. (Note: If you do not have direct access to the Internet, public access to the Internet is available at most public libraries, local schools or at a Small Business Development Center (SBDC) in your area.) Paper submissions and proposals received by any other means will not be accepted, evaluated or considered for award.

Proposers are strongly encouraged to read the Small Business Innovation Research (SBIR)/Broad Agency Announcement (BAA) Public Portal: Registration and Submissions Training Guide found at <https://sbir2.st.dhs.gov> and click on "Reference Materials" and follow the instructions for proposal submission. The Guide provides step-by-step instructions for registering your company and submitting your proposal for the DHS SBIR Program. (Please follow the instructions for submitting an SBIR proposal. Note that the SBIR program does not accept white papers – these are limited to the BAA process.)

Each Proposal must be submitted via the DHS electronic submission website and contain completed:

- Cover Sheets (A and B) (completed on line),
- Technical Proposal (uploaded),
- Cost Proposal (completed on line), and
- Commercialization Report (Phase II Proposals only, if applicable).



## 6.1 *Registration*

Before submitting a proposal for the first time, a small business company must first be registered in the system at <https://sbir2.st.dhs.gov>. After the company is registered, users can begin the proposal submission process. Users must register by associating their information with the company's existing record. It is recommended that the Business Official, or an authorized representative designated by the Business Official, be the first person to register for the small business company. To register in the SBIR system, go to the SBIR Public Portal at <https://sbir2.dhs.gov/>. On the home page, in the navigation menu on the far left, click the "Proposal Submission" link. Once the Proposal Submissions Portal page is displayed, click either the "Register" link at the top of the page or the "Not Registered?" link at the bottom of the page. Complete all steps in the "Access the Log In/Registration Page".

### a. **Taxpayer Identification Number (TIN).**

- (1) If your company has a Taxpayer Identification Number (TIN) and has not yet been registered in this system, enter the company's TIN and state where your company is registered as a taxpayer. Click the "Continue" button. The Registration Search Results page displays the following message "This is the first time your company with TIN [number] and State [state abbreviation] is being registered for the Proposal Submission Handbook." Click the "Proceed with Registration" button. The Registration form page displays.
- (2) If your company does not have a TIN, the nine character number required by the IRS when reporting income tax and other returns, you may generate an identification number to use in lieu of a TIN. You must not use this ID for IRS purposes. Make sure your company generates only one ID. If you are not sure whether your company already has an ID, contact your company point of contact (POC). If you generate the ID, please let your company POC know that you did so and provide the POC with the ID. If your company establishes a TIN after registering in this system with an ID, call the Help Desk at 703-480-7676 to update the TIN information. From the Registration page, click the "here" link at the top of the page. The Company/Organization ID Generation page displays. Note that a blank ID number displays (e.g., 000000000). Click the "Click Here to Generate" button. Doing so allows your company to associate an internally created ID. The system generates a unique ID. When you have generated an ID, click the "Continue to Registration" button. The Registration form displays with your new ID automatically populated in the field. Select the state in which your company pays taxes. Click the "Continue" button. The Registration Search Results page displays a confirmation message "This is the first time your company with TIN [number] and State [state abbreviation] is being registered for the Proposal Submission Handbook." Click the "Proceed with Registration" button. The Registration form page displays.
- (3) If your company has a TIN and is already registered in this system, enter your company's TIN (or ID) and state. Click the "Continue" button. The Registration Search Results page displays and registration instructions are displayed. Enter the Company's PIN in the PIN field. If you do not know it, contact the Point of Contact

listed on the page. Click the “Continue” button. The Registration form page displays.

**b. Complete the Registration Form.**

**Important:** The PIN is required on this form. You will need to know your company’s PIN to complete the registration form. The PIN is used to validate users registering from the same company. If you are the first person to register your company, you will establish the company’s PIN in this form, which subsequent users from your company will use to register in the system. After you have established the PIN, share the PIN with others in your company who will be submitting proposals. If you are a new user whose company has already registered, you will need to know your company’s PIN. If you do not know it, ask your company’s point of contact.

**(1) Company Information.**

- (a) If you are registering your company, enter information related to your company. Required fields are marked with an asterisk.
- (b) If you are a new user whose company has already been registered, the Company Information and Point of Contact Information sections will automatically be populated. Proceed to the User Information section.

**(2) Company Point of Contact.** It is recommended that the Business Official, or an authorized representative designated by the Business Official, be the first person to register for the small business.

- (a) If you are registering your company, enter the information related to the point of contact (POC). Required fields are marked with an asterisk.
- (b) If you are a new user whose company has already been registered, the Company Information and Point of Contact Information sections will automatically be populated. Proceed to the User Information section.

**(3) User Information.** After the company is registered in the system, users must register by associating their information with the company existing record. Enter information related to the user filling out the form. If the user is also the POC, click the check box at the top of the User Information section to automatically populate the fields. Required fields are marked with an asterisk.

**(4) Additional Authentication.** Select answers to the questions in this section. The information will be used to retrieve lost or forgotten passwords. If you forget your password, you will be prompted with the question you selected. If you answer it correctly, a new password will be issued automatically.

## 6.2 *Submissions*

You may submit a proposal(s) in response to a specific topic in this Solicitation. After you start a proposal, you will be required to enter information in five different proposal components (Cover Sheet A, Cover Sheet B, Cost Proposal, Technical Proposal Upload, and mandatory briefing chart upload). At any time before you submit a proposal, you may choose to remove it from the system and not submit it. **Important:** You will need to submit the proposal in order for it to be entered into the review process for consideration for potential award.

- a. **Start a New Proposal.** To respond to this SBIR Solicitation, go the SBIR Public Portal at <https://sbir2.st.dhs.gov/>. On the Home Page, in the navigation menu on the far left, click the “Proposal Submission” link. The Proposal Submission Portal page displays. To enter the portal, you must agree to the security agreement, and enter your username and password that you created during registration. (Note: If you have not yet registered, click on the “Not Registered” link or the “Register” link at the top, and refer to the steps outlined in Section 6.1 above.) If you do not know your password, click the “Forgot Your Password?” link. You will be prompted to submit your username. Your password will be re-set and emailed to you. Read the Security Agreement. If you agree to the Security Agreement, click the “Check here to agree” check box. If you do not agree, do not enter the site. Contact the Help Desk at [dhssbir@reisis.com](mailto:dhssbir@reisis.com) or call 703-480-7676 if desired. In the “Username” field, enter your user name. In the “Password” field, enter your password. Click the “Sign In” button. The Proposal Activity Worksheet page displays. On this page, you can start a new proposal and manage an existing proposal. If applicable, all proposals that you have started – but have not yet submitted – display in the “Proposals in progress” section. All proposals that you have submitted, or you have submitted and are past the due date, are displayed in the “Proposals submitted or past due date” section.

To begin the process of submitting a new proposal, click the “Start New Proposal” button. The Start New Proposal page displays. In the Solicitation field, view the list of available solicitations by clicking the arrow on the drop-down menu. Select the desired solicitation from the list. After you select the solicitation, the “Type and Due Date” fields located in the drop-down menu will automatically display the applicable information. The “Type” field displays the type of proposal you are creating (e.g., Phase I, Phase II). Important note: the “Due Date” field indicates whether a proposal may be initiated. In the Topic Area, view a list of available topics related to the solicitation by clicking the arrow on the drop-down menu. Select the desired topic from the list. When you select a topic, the “Title” field located beneath the drop-down menu will automatically display the topic’s title. Be sure to review the information to verify that you have selected the correct solicitation and topic to which you are submitting your proposal. Each proposal submitted to DHS must have a topic number and must be responsive to only one topic. In the “Proposal Title” field, type the title of the proposal that you are submitting. When you have finished entering the title, click the “Add Proposal to Activity Worksheet” button. (If you do not want to continue with the submission process, click the “Return to Activity Worksheet” button.) The Proposal Activity Worksheet page displays and your proposal displays in the “Proposals in progress” section of the page. You will see either a “Complete” or “Incomplete” under each component of your proposal. Each component of the proposal (Cover Sheet A, Cover Sheet B, Cost Proposal, Tech Proposal Upload and mandatory Briefing Chart Upload **must be complete** before you can click on the “Submit Proposal” link at the lower left corner. Note that when you click on the “Submit Proposal” button at the lower left corner, you must still take additional action, as your proposal is not yet submitted. See the Submit an SBIR Proposal section below (Section 6.2.c).

- b. **Complete an SBIR Proposal.** You must complete Cover Sheet A, Cover Sheet B, the Cost Proposal, and upload the Technical Proposal and mandatory Briefing Chart before you can submit your proposal.

- (1) **Cover Sheet A.** From the Proposal Activity Worksheet, click the “Cover Sheet A” link. The SBIR Proposal Cover Sheet A page displays and a list of incomplete or incorrect items displays at the top of the page in red text. These fields are required and must be completed. The SBIR Proposal Cover Sheet A page contains two different forms. The first form on the Cover Sheet A page contains general organizational and proposal information. Required fields are marked with an asterisk. Enter the information into the fields. The second form on the Cover Sheet A page requires that you certify information about the proposer. All questions on this form must be answered. (Note that we recommend that as you enter your responses to the questions, you click “Save” periodically to ensure that your responses are saved.) When all questions are answered, click “Save and Continue”. After you click “Save and Continue”, the SBIR Proposal Cover Sheet > Update Status page opens. If all required fields are not complete, the name of the incomplete field(s) will be listed. Click the “Return to Cover Sheet A” button to return to Cover Sheet A and complete the form. If you would like to complete the form at a later time, click the “Return to Activity Worksheet” button. If all required fields are complete, the page displays a confirmation message. Click the “Return to Activity Worksheet” button so that you can access the next component in the proposal. (You may also click the “Get Printable Version” button to download a PDF version of the completed Cover Sheet A.) When you click the “Return to Activity Worksheet” button, the Proposal Activity Worksheet page displays. If you completed Cover Sheet A, it is now marked as Complete and displays the date and time of the last update.
- (2) **Cover Sheet B.** From the Proposal Activity Worksheet page, click the “Cover Sheet B” link. The Proposal Cover Sheet B page displays. There are three different information-only sections on this page. The top section displays a list of any fields that are not complete or are incorrect. If this is the first time you are accessing the Cover Sheet B, all fields will be listed. The next section displays the Proposal Number, Topic, and Proposal Title. The Proposal Number is automatically generated. The Topic is automatically populated with the topic you chose when you started the new proposal. The Proposal Title may be edited in Cover Sheet A. The Company Information section displays the information you entered about your company during registration. If you need to change any of this information, contact the Help Desk at 703-480-7676, or [dhssbir@reisis.com](mailto:dhssbir@reisis.com). (You can also click the “Contact Us” link located at the top of the page to view the Help Desk contact information.) There are five different entry sections. Required fields are marked with an asterisk.
  - (a) The Company Point of Contact Information section displays the information entered about your company’s point of contact entered during the registration process. If necessary, update the point of contact information.
  - (b) In the Principal Investigator Information section, enter information about the proposal’s Principal Investigator. If you are the Principal Investigator, click the check box located at the top of the section. Your name, email, and phone number automatically populate those fields; however, you will need to enter your address, city, state, and zip code.

- (c) In the Subcontractor/Partner/Other Participant Information section, enter information about the subcontractor, partner, or other participant, if applicable. If there is no subcontractor, partner, or other participant, click the “Check here to remove this participant” check box. If you have more than one subcontractor, partner, or other participant, click the “Add Participant” button to add another section in which to enter information. In the “Type” field, the options are: Subcontractor, Research Institution, Partner, and Other Participant. If you do not know who your subcontractor, partner, or other participant is at this time, you can click the TBD check box.
  - (d) In the Technical Abstract section, enter your technical abstract. The technical abstract is limited to 250 words. The Technical Abstract must identify the proposed work and the purpose of the proposed work, summarize the implications of the approach, and provide the anticipated results of both Phase I and Phase II, including an assessment of technology readiness levels (TRLs) at the beginning and end of the resultant Phase I effort. The abstract must not contain proprietary or classified data.
  - (e) In the Keywords section, enter key words that would be useful for the SBIR Program Office to use to identify specific content within your proposal. When you are finished, click “Save and Continue”. The SBIR Proposal Cover Sheet > Update Status page opens. If all required fields are not completed, the name of the incomplete field(s) will be listed. Click the “Return to Cover Sheet A” button to return to Cover Sheet A and complete the form. If you want to complete the form at a later time, click the “Return to Activity Worksheet” button. If all required fields are completed, the page displays a confirmation message. (You may also click the “Get Printable Version” button to download a PDF version of the completed Cover Sheet B.) Click the “Return to Activity Worksheet” button to access the next component in the proposal. When you click the “Return to Activity Worksheet” button, the Proposal Activity Worksheet page displays. If you completed Cover Sheet B, it is now marked as Complete and displays the date and time of the last update.
- (3) **Cost Proposal.** Cost proposals will be considered to be binding for 180 days from the closing date of this Solicitation. From the Proposal Activity Worksheet page, click the “Cost Proposal” link.

The Cost Proposal page displays. There are seven different sections/tabs that must be completed:

- Section A: Direct Labor Cost
- Section B: Overhead Cost
- Section C: Other Direct Costs (ODCs)
- Section D: General & Administrative (G&A) Cost
- Section E: Profit/Cost Sharing
- Section F: Deliverables and Audit Info
- Summary: Cost Proposal Summary Review

- (a) When you are finished with Section A, click “Save and Continue” to proceed to Section B. When you are finished with Section B, click “Save and Continue” to proceed to Section C, etc. Continue until you are finished with Section F. (Note that we recommend that as you enter your information, you click “Save” periodically to ensure that your responses are saved.) Click “Save and Continue” to proceed to the Summary Tab.
  - (b) On the Summary Tab, review the Cost Proposal information. If you need to edit the information, click the tab to return to that specific tab. Update the information and click “Save”. Click the Summary tab to return to the Summary. If everything is correct, click the “Complete Cost Proposal” button. **If you do not click this button, the Cost Proposal will be considered “Incomplete” and will not be printable by the system.** Clicking the “Complete Cost Proposal” button does not prevent you from making changes to the Cost Proposal form. However, if you make any changes, your budget form will once again be marked as “Incomplete.”
  - (c) The SBIR Cost Proposal > Update Status page opens. Click the “Return to Activity Worksheet” button to access the next component in the proposal. (You may also click the “Get Printable Version” button to download a PDF version of the completed Cost Proposal. When you click the “Return to Activity Worksheet” button, the Proposal Activity Worksheet page displays. The Cost Proposal component is now marked as Complete and the date of the last update is displayed.
- (4) **Technical Proposal Upload.** Prepare your Technical Proposal in a single Portable Document Format (PDF) file outside of the system. The Technical Proposal must be a single file, including all graphics. Check it for viruses, and upload it to the submission website following the instructions below. Do not lock, password protect, or encrypt your file. Every uploaded file will be scanned for viruses by the DHS. If a virus is detected, the file will be deleted and may cause rejection of the proposal. From the Proposal Activity Worksheet page, click the “Tech Proposal Upload” link to upload your Technical Proposal. The “Technical Proposal Upload” page displays. Click the “Browse...” button. When you have selected the documents to upload, click the “Upload Now” button. Note: all documents must be in PDF format and must not exceed 10 MB. If your upload is successful, the page will display a confirmation message of your upload, and the document name will display in the Currently Uploaded File(s) section. If you decide to upload a different document, it will replace the previously uploaded document. The system will automatically send a confirmation email to the email address you specified on Cover Sheet B. **This email is not a receipt of submission of your entire proposal.** It merely is a message to confirm the successful upload of your technical proposal. Additional action is required by you in order to submit your full complete proposal. If you do not receive an email confirmation, check your Spam/Junk email box and/or contact the Help Desk at 703-480-7676 or [dhssbir@reisis.com](mailto:dhssbir@reisis.com). When you are finished with the Technical Proposal upload, click the “Return to Activity Worksheet” button. The Proposal Activity Worksheet page displays. The Tech

Proposal Upload component is now marked as Complete and the date and time of the last update is displayed.

- (5) **Briefing Chart (mandatory).** The mandatory one-page briefing chart must be submitted to summarize the project. The Briefing Chart will not be evaluated or used in the evaluation process. It will be used to describe the project if the proposal is recommended for award. It must not contain any proprietary or classified data. Submission of the Briefing Chart is not counted against the 25-page limit. The template for the Briefing Chart is provided in Section 10. Prepare your Briefing Chart in a single Portable Document Format (PDF) file outside of the system. Check it for viruses, and upload it to the submission website following the instructions below. Do not lock, password protect, or encrypt your file. Every uploaded file will be scanned for viruses by the DHS. If a virus is detected, the file will be deleted and may cause rejection of the proposal. From the Proposal Activity Worksheet, click the “Briefing Chart” link. The Briefing Chart Upload page displays. Click the “Browse ...” button. Select the document to upload, click the “Upload Now” button. The chart must be in pdf format and must not exceed 2 MB. If your upload is successful, the page will display a confirmation message of your upload, and the document name will display in the Currently Uploaded File(s) section. If you decide to upload a different document, it will replace the previously uploaded document. The system will automatically send a confirmation email to the email address that you specified on Cover Sheet B. **This email is not a receipt of submission of your entire proposal.** It merely is a message to confirm the successful upload of your Briefing Chart. Additional action is required by you in order to submit your full complete proposal. If you do not receive a confirmation email, check your Spam/Junk email box and/or contact the Help Desk at 703-480-7676 or [dhssbir@reisys.com](mailto:dhssbir@reisys.com). When you are finished, click the “Return to Activity Worksheet” button. The Proposal Activity Worksheet page displays. The Briefing Chart Upload component is now marked as Complete and the date and time of the last update is displayed.

**c. Submit an SBIR Proposal.**

- (1) If you are already logged into the system, you are on the Proposal Activity Worksheet page. From this page, if all the components of your proposal are marked as Complete, click the “Submit Proposals” link located in the bottom left corner. The Submit Proposal page displays. **Note that you must still click the “Submit Proposal” button to submit the proposal! This is mandatory – the burden is on the proposer to do so. If this is not done, your proposal will not be entered into the review process and it will not be considered for award.** Important note: You will not be able to make any changes to your proposal after it is submitted. The Submit Proposal Confirmation page displays. The status of all forms must show “Complete” before you may submit a proposal. You should print this page for your records. **You must click the “Submit Proposal” button at the lower left corner on this page (i.e., Submit Proposal page) to submit the proposal!** Click the “Return to Activity Worksheet” button. The Proposal Activity Worksheet page displays. The proposal you submitted now displays in the “Proposals submitted or past due date” section of the page. Your proposal will be reviewed by program

officials and you will be contacted after a decision is made on your proposal. Generally this is four months after the solicitation close date. The system will automatically send a Submission Confirmation email to the email address that you specified on Cover Sheet B. If you do not receive an email confirmation, contact the Help Desk immediately at 703-480-7676 or [dhssbir@reisis.com](mailto:dhssbir@reisis.com). Proposals received after the deadline will not be accepted or evaluated.

- (2) If you exited the system and are returning to submit the proposal, go to the Public Portal at <https://sbir2.st.dhs.gov/>, log in, and click “Proposal Submission” in the menu on the left. You will be brought to the “Proposal Activity Worksheet” page. From this page, if all the components of your proposal are marked as Complete, click the “Submit Proposals” link located in the bottom left corner. The Submit Proposal page displays. **Note that you must still click the “Submit Proposal” button to submit the proposal! This is mandatory – the burden is on the proposer to do so. If this is not done, your proposal will not be entered into the review process and it will not be considered for award.** Important note: You will not be able to make any changes to your proposal after it is submitted. The Submit Proposal Confirmation page displays. The status of all forms must show “Complete” before you may submit a proposal. You should print this page for your records. **You must click the “Submit Proposal” button at the lower left corner on this page (i.e., Submit Proposal page) to submit the proposal!** Click the “Return to Activity Worksheet” button. The Proposal Activity Worksheet page displays. The proposal you submitted now displays in the “Proposals submitted or past due date” section of the page. Your proposal will be reviewed by program officials and you will be contacted after a decision is made on your proposal. Generally this is four months after the solicitation close date. The system will automatically send a Submission Confirmation email to the email address that you specified on Cover Sheet B. If you do not receive an email confirmation, contact the Help Desk immediately at 703-480-7676 or [dhssbir@reisis.com](mailto:dhssbir@reisis.com). Proposals received after the deadline will not be accepted or evaluated.
- (3) If your proposal is selected for award, the DHS designated Contracting Officer will contact you for all appropriate signatures. Proposers are encouraged, but not required, to have a CAGE code and DUNS number at the time of proposal submission; however, companies must obtain these before a contract can be awarded to the company. For planning purposes, the Phase I contract award process is normally completed within 30 to 45 days from issuance of the selection notification letter to Phase I proposers. Successful proposers will be expected to begin work no later than 30 days after contract award.

### 6.3 *Proposal Deadline*

Proposals will be accepted from November 16, 2011 – January 5, 2012. The Deadline for electronic receipt of proposals is 2:00 PM ET January 5, 2012. Proposals must be completely submitted to the DHS submission website by the specified closing time of 2:00 PM EST, on January 5, 2012. Complete submission means that the entire proposal: Cover Sheet A, Cover Sheet B, Cost Proposal, and Technical Proposal upload, and Briefing Chart upload must be properly completed and fully submitted to the DHS submission website. The Solicitation



deadline is firm. Late proposals will not be accepted or evaluated. Proposals received via any other means except the DHS submission website will not be accepted or evaluated. As the close date draws near, heavy traffic on the web server may cause delays. Plan ahead and leave ample time to prepare and submit your proposal. Proposers bear the risk of website inaccessibility due to heavy usage in the final hours before the Solicitation closing time. *In accordance with FAR 52.215-1, proposers are responsible for submitting proposals, and any modification, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the Solicitation.*

#### **6.4 *Notification of Proposal Receipt***

Notification of receipt of each full proposal (Cover Sheet A, Cover Sheet B, Cost Proposal, and Technical Proposal upload, and mandatory Briefing Chart upload) will be provided via e-mail to the email address specified on Cover Sheet B. If you do not receive an email confirmation, contact the Help Desk immediately at 703-480-7676 or [dhsbir@reisys.com](mailto:dhsbir@reisys.com).

#### **6.5 *Information on Proposal Status***

Evaluation of Phase I proposals and award of contracts will be expedited, but no information on proposal status will be available until the final selections are made. However, Contracting Officers may contact any and all qualified proposers prior to contract award. Selections will be posted on the DHS SBIR website when all selected proposals have been negotiated for award, generally within four months of the Solicitation closing date.

Evaluation of Phase II proposals will begin upon receipt of the proposals. DHS reserves the right to make Phase II awards incrementally as Phase II proposals are received and evaluated. Selections will be posted on the DHS SBIR website as awards are made.

#### **6.6 *Evaluation Results and Debriefing of Unsuccessful Proposers***

Any proposer that submits a request within three (3) days of being notified of their proposal being selected or non-selected for award will be provided a copy of the evaluation results (i.e., the consensus review). The request must be emailed to [STSBIR.PROPOSALS@dhs.gov](mailto:STSBIR.PROPOSALS@dhs.gov). Be advised that a proposer that fails to submit a timely request is not entitled to a debriefing, although untimely debriefing requests may be accommodated at the Government's discretion.

#### **6.7 *Correspondence Relating to Proposals***

All correspondence relating to proposals must cite the SBIR Solicitation Number, contractor's proposal number, and the specific Topic Number.

### **7.0 *SCIENTIFIC AND TECHNICAL INFORMATION ASSISTANCE***

#### **7.1 *SAFETY Act***

Congress enacted the Support Anti-terrorism by Fostering Effective Technologies Act of 2002 (the "SAFETY Act") as part of the Homeland Security Act of 2002. The SAFETY Act provides limitations on the potential liability of those concerns that develop and provide qualified anti-terrorism technologies. The DHS Science and Technology Directorate, acting through its Office

of SAFETY Act Implementation, encourages the development and deployment of anti-terrorism technologies by making available the SAFETY Act’s system of “risk management” and “liability management.”

Proposers submitting proposals in response to this Solicitation are encouraged to submit SAFETY Act applications on their existing technologies and are invited to contact the Office of SAFETY Act Implementation (OSAI) for more information at 1-866-788-9318 or visit OSAI’s website at [www.safetyact.gov](http://www.safetyact.gov).

### **7.2 *Scientific and Technical Reference***

Scientific and technical reference information is provided with each individual topic provided in Section 8.0 of this Solicitation.

### **7.3 *State and Other Assistance Available***

Many states have established programs to provide services to those small concerns and individuals wishing to participate in the Federal SBIR Program. These services vary from state to state, but may include:

- Information and technical assistance.
- Matching funds to SBIR recipients.
- Assistance in obtaining Phase III funding.

Contact your State SBIR Support office at [www.ed.gov/offices/OERI/SBIR/statelink.html](http://www.ed.gov/offices/OERI/SBIR/statelink.html) for further information.

Small businesses may seek general administrative guidance from small and disadvantaged business utilization specialists located in various activities throughout the continental United States.

## **8.0 TECHNICAL TOPICS**

This Section contains detailed topic descriptions outlining the technical areas in which the DHS Science and Technology (S&T) Directorate requests proposals under this Solicitation for innovative R/R&D from small businesses. Topics are listed and numbered separately. A list of the topics currently eligible for proposal submission is included in this Section followed by full topic descriptions. These are the only topics for which proposals will be accepted at this time.

DHS invests in programs offering the potential for revolutionary changes in technologies that promote homeland security or accelerates the prototyping and deployment of technologies that reduce homeland vulnerabilities. Thus, the DHS SBIR goal is to pursue as many innovative research ideas and concepts that promote homeland security with the potential for commercialization.

The technical topics provided in this DHS S&T SBIR FY 12.1 Solicitation to which small businesses may respond are UNCLASSIFIED. Classified Phase I Proposals will not be accepted. Although the topics are unclassified, the subject matter may be considered to be a “critical technology.” If a contractor plans to employ non-U.S. citizens in the performance of a DHS

SBIR Contract, the contractor shall identify these individuals (including subcontractors and consultants) in its proposal as specified in Section 3.5.b (7) of this Solicitation.

**8.1 *DHS SCIENCE AND TECHNOLOGY (S&T) DIRECTORATE: SBIR TOPICS***

- H-SB012.1-001      Non-freezing Portable Vehicle Wash Tunnels**
- H-SB012.1-002      Moving Target Defense**
- H-SB012.1-003      Safe Standoff Detection of Bulk Explosives on a Person**
- H-SB012.1-004      Firearms and Ammunition Test Equipment**
- H-SB012.1-005      Capability for the Tracking of Any and Every Person within a Security Perimeter**
- H-SB012.1-006      Swarm Robotic Sensing Platform for Search and Rescue**

### 8.1.1 SBIR TOPIC NUMBER: H-SB012.1-001

**TITLE:** Non-freezing Portable Vehicle Wash Tunnels

**TECHNOLOGY AREAS:** Foreign Animal Disease, Depopulation, Disposal and Decontamination

**OBJECTIVE:** Improve foreign animal disease outbreak emergency response by developing low-cost, durable, non-freezing portable vehicle wash tunnels to clean/disinfect contaminated vehicles.

**DESCRIPTION:** In the event of a foreign animal disease (FAD) outbreak in the United States, such as highly pathogenic avian influenza or Foot and Mouth Disease (FMD), export markets will be severely impacted until the United States can regain international status as free from the disease. Freedom is achieved by containing the outbreak, preventing disease spread, and eliminating the pathogen. A primary mode of spreading disease is by personnel and vehicles contacting contaminated material, including infected livestock, soil or animal bedding, then tracking the pathogen to another location on shoes, clothing, and vehicle surfaces. Therefore, it is critically important that personnel and vehicles be disinfected prior to moving during an outbreak so the outbreak can be controlled as quickly as possible. However, if the disinfection process is too cumbersome, compliance may be reduced, thereby increasing risk.

One of the major concerns during an outbreak is economic impact, which not only arises from lost export markets, but also from the cost of controlling the outbreak itself. Any operation with multiple steps requiring significant labor, supplies and equipment, such as cleaning and disinfection, can greatly increase the cost of the response, and costs escalate the longer the outbreak continues. Therefore, strategies to minimize labor costs while increasing speed of such an operation can significantly reduce outbreak control time and expenses. Automated vehicle disinfection is one strategy that can both drastically reduce labor costs and response time, while facilitating outbreak control. Recent FMD outbreak experiences in the United Kingdom and South Korea indicate that disinfecting vehicles during cold weather conditions is extremely challenging if disinfectant mixtures or disinfectant lines freeze.

Commercial car/truck wash stations can meet the need for automation and freeze-protection, but the stations are typically not located exactly where needed, such as at the entrance to infected premises, and the corrosiveness of some disinfectants may damage commercial equipment. Although there are portable, non-freezing truck wash stations available commercially, the large automated ones are very expensive and must be moved with a crane, which adds to response cost and delays. Overall, there is a general lack of ready-to-use equipment for portable, temporary vehicle wash stations, which can be readily acquired, deployed and used.

Therefore, it is necessary to develop portable automated vehicle wash stations that can be easily shipped and installed in the field, either on farms or roadway checkpoints. The units should be:

- light-weight – ideally unit can be transported on the back of a pick-up truck, unloaded by 2 – 4 people. At a minimum, it should be transportable in or on a vehicle readily available to state and local emergency responders.
- cost-effective (designed to minimize the cost of the unit to the maximum extent possible);
- rapidly assembled (set up by 2 – 4 people in less than 4 hours);
- semi-permanent (operating for days to months at a time); and
- rugged enough for large volume traffic.

The units should be designed to:

- clean at least a ¾ ton pick-up truck with design scalable to 18-wheeler;
- address a wide-variety of pathogens including viruses, bacteria and spore-formers, using disinfectant solutions which may degrade some material:
  - acids, alcohols, aldehydes, alkalis, biguanides, halogen compounds, oxidizing agents, phenols, and/or quaternary ammonium compounds may be used as disinfectants,
  - a 4- to 6-log reduction in microorganisms (per EPA guidance available at <http://www.epa.gov/oppad001/sciencepolicy.htm>) is considered disinfection.
- prevent freezing in cold weather conditions:
  - unit should be non-freezing to -25C (-13F);
- achieve complete vehicle treatment including the undercarriage:
  - heavily mud-caked vehicles will likely be pre-treated, but the unit will have to clean some surface debris off the vehicles;
  - pressure would be similar to that used in commercial car washes. It is assumed a vehicle will be driven into the tunnel, the vehicle will be washed with detergent, rinsed with water, disinfected followed by the required contact time (usually 10 – 30 minutes for common disinfectants, depending on ambient temperature) and rinsed again.
- collect disinfectant runoff:
  - disinfectant can be recycled if the recycled disinfectant solution is as efficacious as the original solution;
  - disposal of collected water to be handled by others;
  - rinse water must be collected and conveyed to containers provided by others, or treated and recycled as part of system.

Ideally, the units will be cost-effective, user-friendly, have low emissions, conserve energy, and be low-maintenance. Some of the research and development challenges of this concept include:

- Engineering a collapsible, light-weight tunnel which delivers the optimal flow of disinfectant chemicals to all surfaces of a vehicle, including the undercarriage. This involves materials research to identify/develop light-weight, flexible, yet rugged fabrics and tubing which can withstand traffic, weather, and harsh chemicals under pressure. For example, bleach is known to degrade certain rubber-like materials and citric acid could corrode metal components so the tubing assembly must be resistant to damage from common disinfectants.

- Factory-assembling or quickly field-assembling system components with flexible but stable hinges or joints that can be collapsed and erected manually, preferable by a single person.
- Designing the base of the unit to promote flow of liquids to a single point for pumping to separate collection containers, regardless of the terrain of the premises.
- Combining the components in a manner to maximize personnel safety during set-up, operations, and dismantling; maximize cleaning and disinfection efficiency and effectiveness; and minimize the need for operations and maintenance labor.

**PHASE I:** Develop a concept for a new technology or modify an existing technology. Demonstrate the feasibility of the technology at the bench or pilot scale level.

**PHASE II:** Develop a fully functional prototype of the unit and demonstrate it in the field. Full functionality includes the ability of the system to: 1) accommodate personnel and vehicles; 2) contain and collect wash water; 3) pump washwater; 4) deliver detergent and disinfectant solutions to a person or vehicle; 5) automatically deliver disinfectant to all sides of a vehicle, including the undercarriage, at sufficient pressure to ensure complete removal of visible soil on vehicle surfaces including tires; and 6) protect the disinfectant solution from freezing while achieving required contact times.

**PHASE III: COMMERCIAL APPLICATIONS:** Upon delivery and demonstration of a prototype, the technology should be suitable for manufacturing and sale in the commercial marketplace, with some minor modifications acceptable. The commercial units would be available for purchase/lease by governmental and/or response agencies who would use the units for deployment during an animal disease outbreak to assist the response and recovery effort and contain the outbreak. In the absence of an outbreak, the units can be used for routine biosecurity at production facilities to prevent an outbreak and facilitate continuity of a high-quality, plentiful, and low-cost food supply.

#### **REFERENCES:**

United States Department of Agriculture, Animal and Plant Health Inspection Service. Foreign Animal Disease Preparedness and Response Plan, Highly Pathogenic Avian Influenza, Biosecurity (Feb 2010),

[http://www.aphis.usda.gov/animal\\_health/emrs/nahems.shtml](http://www.aphis.usda.gov/animal_health/emrs/nahems.shtml)

United States Department of Agriculture, Animal and Plant Health Inspection Service. Foreign Animal Disease Preparedness and Response Plan, Highly Pathogenic Avian Influenza, Cleaning and Disinfection (Feb 2010).

[http://www.aphis.usda.gov/animal\\_health/emrs/nahems.shtml](http://www.aphis.usda.gov/animal_health/emrs/nahems.shtml)

**KEY WORDS:** Animal disease outbreak, Emergency vehicle decontamination

### 8.1.2 SBIR TOPIC NUMBER: H-SB012.1-002

**TITLE:** Moving Target Defense

**TECHNOLOGY AREAS:** Cyber Security

**OBJECTIVE:** Research into moving target defense technologies will enable us to create, analyze, evaluate, and deploy mechanisms and strategies that are diverse and that continually shift and change over time to increase complexity and cost for attackers, limit the exposure of vulnerabilities and opportunities for attack, and increase system resiliency.

**DESCRIPTION:** In the current environment, our systems are built to operate in a relatively static configuration. For example, addresses, names, software stacks, networks, and various configuration parameters remain relatively static over relatively long periods of time. This static approach is a legacy of information technology system design for simplicity in a time when malicious exploitation of system vulnerabilities was not a concern.

In order to be effective, adversaries must know a particular vulnerability of a system. The longer the vulnerability of a system exists, the more likely it is to be discovered and then exploited. Many system vulnerabilities are published by researchers and software vendors in order for system owners to patch those vulnerabilities. A system that remains unpatched is vulnerable to exploitation. Vulnerabilities that are not publicly disclosed are called zero-day vulnerabilities, and are known to a limited set of people. Zero-day vulnerabilities present a large risk to system owners because without knowledge of the vulnerability, system owners have no way to patch it.

It is now clear that static systems present a substantial advantage to attackers. Attackers can observe the operation of key IT systems over long periods of time and plan attacks at their leisure, having mapped out an inventory of assets, vulnerabilities, and exploits. Additionally, attackers can anticipate likely responses and deploy attacks that escalate in sophistication as defenders deploy better defenses. Attackers can afford to invest significant resources in developing attacks since the attacks can often be used repeatedly from one system to another.

The magnitude of this problem suggests that the information technology community needs a radically new approach for IT system defense. To visualize the elements of the new environment, observe that for attackers to exploit a system today, they must learn about a vulnerability and hope that it is present long enough to exploit. For defenders to defeat attacks today, they must develop a signature of malware or attacks and hope it is static long enough to block that attack. Malware writers develop mechanisms to rapidly change malware in order to defeat detection mechanisms. We, as defenders, should learn from this approach, and build systems that rapidly change, never allowing the exploitation of a particular vulnerability to impair the ability of a system to perform its mission/function, or if exploited once, not allowed to be exploitable again. If done correctly, this "moving target" defense can present a formidable obstacle to attackers since attackers depend on knowing a system's vulnerabilities a priori.

Therefore, a game-changing approach to building self-defending systems can and must be developed. Protecting systems (thus avoiding exposed vulnerabilities) to the greatest extent possible should still be the first goal. This new approach is known as, "Moving Target Defense (MTD)." An important benefit of moving target defense is to decrease the known attack surface area of our systems to

adversaries while simultaneously shifting it; a key challenge of moving target defense is to ensure that our systems remain dependable to their users and maintainable by their owners. By making the attack surface of software appear chaotic to adversaries, it forces them to significantly increase the work effort to exploit vulnerabilities for every desired target. For instance, by the time an adversary discovers a vulnerability in a service, the service will have changed its attack surface area so that another exploit against that vulnerability will be ineffective. The characteristics of a MTD system are dynamically changed in ways that are manageable by the defender yet make the attack space appear unpredictable to the attacker. Moving target defense technology changes the game by wresting the advantage from the attacker because it eliminates the availability of constant or slowly-changing vulnerability windows that allow attackers to lie in wait and conduct useful experiments on persistent vulnerabilities. This game-changing approach challenges the traditional approach which counsels that adding complexity to our systems adds risk. Conversely, the complexity of today's compute platforms and analytic and control methods can now be used to frustrate our adversaries. The challenge is to demonstrate that complexity is indeed a benefit and not a liability.

The MTD area has its underpinnings in fundamental research in the following supporting or component areas: virtualization, multi-core processing, new networking capabilities, systems management, and evolutionary resiliency and defense methods. The results of the National Cyber Leap Year (NCLY) Summit (see References) categorized the current needs into research areas for consideration as follows:

- (1) Characterize the vulnerability space and understand the effect of system randomization on the ability to exploit those vulnerabilities.
- (2) Understand the effect of randomization of individual components on the behavior of complex systems, with respect to both their resiliency and their ability to evade threats.
- (3) Develop a control mechanism that can abstract the complexity of MTD systems and enable sound, resilient systems management.
- (4) Enable the adaptation of MTD mechanisms as the understanding of system behavior matures and our threat evolves.

**PHASE I:** Demonstrate new methods, techniques, tools, and/or designs providing improved “moving target defense” technologies using the component areas identified above. Proofs-of-concept may include existing legacy products and tools, with new capabilities and/or services that could be applied in operational environments at either the individual system level or network level or both.

**PHASE II:** Develop and implementation operationally ready tools, methods, mechanisms, and/or services providing “moving target defense” capabilities with initial solution capable of being demonstrated in operational systems and/or network environments.

**PHASE III: COMMERCIAL APPLICATIONS:** The final developed “moving target defense” tools and techniques will be expected to be used in operational Federal, State, and Local CIO environments, and potentially usable by commercial Internet Service Providers (ISPs) and IT vendors. It is anticipated that those tools and techniques delivered as open source technology will require support, custom extensions, and additional applications as they are commercially introduced.



**REFERENCES:**

“Co-Chairs’ Report.” Proceedings from National Cyber Leap Year Summit 2009, pp. 46-57, 2009.

<http://www.cyber.st.dhs.gov/documents.html>

“Participants’ Ideas Report.” Proceeding from National Cyber Leap Year Summit 2009, pp. 75-85, 2009.

<http://www.nitrd.gov/NCLYSummit.aspx>

**KEY WORDS:** Information Assurance, Network Security, Virtualization, Systems Management

### 8.1.3 SBIR TOPIC NUMBER: H-SB012.1-003

**TITLE:** Safe Standoff Detection of Bulk Explosives on a Person

**TECHNOLOGY AREAS:** Explosives Detection and Sensors

**OBJECTIVE:** Develop a safe method to chemically detect explosives concealed on or carried by a person at a distance.

**DESCRIPTION:** The Explosives Division of the Department of Homeland Security Science and Technology Directorate seeks ideas and technologies for the safe detection of bulk explosives on a person at a standoff distance. There is significant need for the ability to detect and chemically identify concealed explosives on or carried by a person. These technologies could be deployed at mass transit locations, national security event checkpoints, or other checkpoints. Therefore the technology needs to scan a large amount of people in a short time at a significant standoff distance between the detector and the person being considered. This is not a request for anomaly detection techniques, rather methods to detect the presence of explosives themselves. In addition, this is not a request for trace explosives detection that may be present on the outside of the clothing or bag. Identification of the explosives can greatly assist response teams and venue authorities to mitigate a detection alarm quickly and safely. The desired technology must be safe to use on humans with limited ionizing radiation and no possible negative health effects. The technology should be able to penetrate outer layers of clothing or carried bags (such as a purse or backpack). Technologies should also detect ounces of explosive material. Explosives of interest include commercial, military, and homemade explosives (in particular peroxide based). Ideally the technology will detect the presence of explosives concealed on a person and carried in a bag. Specifically, methods that rely on differentials between the human body and a threat will not be applicable.

**PHASE I:** Efforts will use theoretical and/or empirical data to determine if the proposed detection method is feasible. A successful Phase I effort will result in a proof of concept of the proposed detection technique with theoretical and/or experimental data to support this conclusion. The concept must be proven or within reasonable estimations proven before a Phase II award will be considered.

**PHASE II:** Efforts will develop, demonstrate and deliver a breadboard (TRL 3-4) prototype of the technology. A successful technology should detect an appropriate explosive simulant material with reasonable accuracy and specificity.

**PHASE III: COMMERCIAL APPLICATIONS:** Efforts will develop and design an advanced prototype (TRL 5-6) for piloting in a structured crowd environment. This pilot supports the Detect program with applications to surface transportation and various DHS checkpoint environments. If a Phase III contract is awarded, a prototype will be delivered after government acceptance testing.

**REFERENCES**

J. Akhavan, *The Chemistry of Explosives*, second ed. (The Royal Society of Chemistry, Cambridge, 2004)

J. Yinon and S. Zitrin, *The analysis of explosives*, Vol. 3 (Pergamon, USA, 1983)

**KEY WORDS:** Explosives, Improvised Explosive Devices, PBIED, Suicide Bombers, Explosive Devices

#### 8.1.4 SBIR TOPIC NUMBER: H-SB012.1-004

**TITLE:** Replicating Human Functionality during Firearms and Ammunition Testing with a Mechanical Device

**TECHNOLOGY AREAS:** 3D Force Modeling, Mechanical device/prototype development

**OBJECTIVE:** Develop test equipment for acceptance and proof testing of handguns and handgun ammunition, where the solution must take into account natural gun recoil characteristics when held by a broad demographic range of shooters.

**DESCRIPTION:** The National Firearms and Tactical Training Unit (NFTTU) provides support to over 62,000 armed officers and tests on average close to 200,000 handgun rounds each year. Much of the firearms and ammunition testing is carried out manually by NFTTU personnel through repetitive firing. Multiple forces are exerted on the body during the firing of a gun and repetitive usage can often translate to acute body pain. The NFTTU needs an end-to-end solution to replace the human firing system with a mechanical device. The device should:

- Be easy to mount and re-load with full magazines;
- Mimic the exact counter forces of a broad demographic range of human hands during firing, recoil cycle, bullet/cartridge ejection. and post-firing forward movement of the gun; and
- Allow for similar accuracy as when completed by human testers.

Initial development of this capability gap will include modeling of complex, multi-degree forces exerted on the human body when a gun is fired as well as the resulting reactionary/counter forces that are then exerted on the gun by the human body. These models might already exist, however part of filling this capability gap will include research on current initiatives in the federal, defense and private sector arenas.

**PHASE I:** Develop and deliver a virtual model that will be able to characterize the various forces that are exerted on the human body by continuous manual testing of firearms and ammunition. The virtual model must include all forces involved during the firing of a handgun.

**PHASE II:** Develop and deliver a working prototype with engineering plans derived from the Phase I virtual model (3D models, finite element analysis, motion modeling, etc.) that successfully responds to the description above.

**PHASE III: COMMERCIAL APPLICATIONS:** Operational Test and Evaluation (OT&E) plans to be developed are subject to prior adherence to D-102 System Engineering Lifecycle requirements, followed by OT&E at the NFTTU. Acceptance by the NFTTU into operational use will follow testing of the device.

**REFERENCES:**

National Firearms and Tactical Training Unit (NFTTU):

<http://www.ice.gov/about/offices/management-administration/nfttu/>

**KEYWORDS:** Firearms testing, ammunition testing, firearms bench rest

### 8.1.5 SBIR TOPIC NUMBER: H-SB012.1-005

**TITLE:** Capability for the Tracking of Any and Every Person within a Security Perimeter

**TECHNOLOGY AREAS:** People Screening, Human Factors/Behavioral Sciences

**OBJECTIVE:** Develop an accurate, low-cost, reconfigurable capability that enables safe, continuous, high confidence tracking of persons within a security perimeter.

**DESCRIPTION:** As a person undergoes security screening, he or she is typically positively identified through a credential check only once at the entrance to a security perimeter. Subsequent to that one credential check, it is difficult, if not impossible, to definitively associate any other cues; e.g., behavioral or physiological, with specific individuals once they have passed through that checkpoint.

As the Science and Technology Directorate investigates the use of distributed screening (screening of persons for an extended period of time within a security perimeter rather than once and only once at a single checkpoint), it will be necessary to be able to associate specific behavioral and physiological cues detected remotely through other means/with other sensors, and which may be potentially diagnostic of malintent (the intent to cause harm to our country or its citizens), with specific individuals with a very high degree of confidence and accuracy. The proposed method of tracking should not be dependent on commonly accepted biometric identifiers (i.e., facial recognition) in order to ensure that the proper safeguarding of Personally Identifiable Information (PII) does not become an issue. Nor should the system be designed around Radio Frequency Identification (RFID) technology. This requires that a capability be developed that enables the continuous tracking of individuals, without their active cooperation, in crowded environments so that cues detected through other remote sensors can be accurately and unambiguously assigned to specific persons being screened.

At the end of Phase I, it is desired that the performer be able to show that the proposed technology is feasible, low-cost, networkable – potentially in a distributed array – and is safe for use on humans. This may require the use of preexisting, commercial-off-the-shelf items that have been previously demonstrated or otherwise certified to be safe for use on human subjects.

**PHASE I:** At the end of Phase I, the performer will deliver and demonstrate a small-scale, proof-of-concept/prototype capability that is reliable, low cost, networkable, and reconfigurable and which can serve as the foundation of a larger scale capability.

**PHASE II:** At the end of Phase II, the performer will be able to demonstrate and deliver a prototype of a larger scale tracking capability based on the Phase I deliverable that can accurately and continuously track at least one individual in an environment that is representative of an operational security screening setting. It is also highly desirable that the capability be able to detect other cues potentially diagnostic of malintent; e.g., gait, remotely.

**PHASE III: COMMERCIAL APPLICATIONS:** In Phase III, it is envisioned that the performer will be able to track multiple individuals (three to five) in a crowded environment;

e.g., critical infrastructure (such as a national monument, major sports stadium, or power generation plant) or a shopping mall (for the purposes of retail security/theft prevention).

**REFERENCES:**

The Cooperative Engagement Capability. Johns Hopkins APL Technical Digest, Volume 16, Number 4 (1995)

<http://www.jhuapl.edu/techdigest/TD/td1604/APLteam.pdf>

Sensor Networks: An Overview. Archana Bharathidasan and Vijay Anand Sai Ponduru, Department of California, Davis, CA

<http://wwwcsif.cs.ucdavis.edu/~bharathi/sensor/survey.pdf>

**KEY WORDS:** Accurate, Networked, Distributed, Precision Tracking, Gait Analysis, Cooperative, Sensor Networking

### 8.1.6 SBIR TOPIC NUMBER: H-SB012.1-006

**TITLE:** Swarm Robotic Sensing Platform for Search and Rescue

**TECHNOLOGY AREAS:** Emergency/disaster response

**OBJECTIVE:** Improve the quality of response for first responders by developing a prototype sensing platform to enhance awareness during a situation.

**DESCRIPTION:** The distributed bot sensing networks can enhance the quality of response for the emergency response teams. This capability will enable responders to have advanced situational awareness in an indoor environment. Currently Search and Rescue teams use cameras and optics to view indoor spaces. The goal of the effort would be to develop new and innovative sensing research, and develop a prototype swarm bot sensing sensors and platforms capable of providing imagery and context for an indoor scene to enhance and augment situational awareness (audio, video display, etc.). It is envisioned that these platforms/vehicles would be small, easy to handle, and include autonomy to handle movement, fault tolerance, path/track management, information handling, and "perching" capabilities on uneven terrain to stare and/or listen (desirable to save power). These platforms must be low cost systems and nearly disposable units since operating environment may be hazardous. The system should be able to operate individually or in teams via collaborative movement and goal management.

**PHASE I:** Provide the results of a feasibility and technology assessment, component selection, and a design refinement of the prototype with concept demonstration.

**PHASE II:** Prototype development and demonstration of the concept developed in Phase I, market research and plans for follow-on development and commercialization that may include strategic partnering.

**PHASE III: COMMERCIAL APPLICATIONS:** A low cost, nearly disposable unit in an emerging field will foster commercialization opportunities within industry. Linking with GLANSER (Geospatial Location Accountability and Navigation System for Emergency Responders, a DHS S&T Directorate program) will help with commercialization, limited production and market interaction based on GLANSER's commercialization plan (already underway). In addition, the technology will improve overall situational awareness for first responders, a large and rapidly growing market. The technology developed will have significant impact in the public and private sector.

#### **REFERENCES:**

Energy-Efficient Indoor Search by Swarms of Simulated Flying Robots Without Global Information. Stirling, Timothy; Wischmann, Steffen; Floreano, Dario (Swarm Intelligence, 2010)

<http://infoscience.epfl.ch/record/144015>



Mobile Robots and Sensor Network: Working Together. Maxim A. Batalin and Gaurav S. Sukhatme.

[http://www.cens.ucla.edu/Education/RR\\_Posters/Research%20Review/040\\_Batalin.pdf](http://www.cens.ucla.edu/Education/RR_Posters/Research%20Review/040_Batalin.pdf)

**KEY WORDS:** Miniaturization, energy-efficiency, mobile sensor platforms and distributed ad-hoc mesh networks, artificial intelligence, optimal navigation and control

## **9.0 DHS SBIR FY 12.1 PHASE I SBIR CHECKLIST**

**For use as a guide only. Do not include in the proposal submission.**

### **Page Numbering:**

- Number all pages of your proposal consecutively. The Cover Sheets A and B count as pages 1 and 2 no matter how they print out. The Technical Proposal begins on page 3 and continues through page 24. The Cost Proposal page 25 (no matter how it prints out).
- Total for each Phase I proposal is 25 pages inclusive of Cover Sheets, Technical Proposal, Cost Proposal and resumes. If proposed, the Phase I Option Cost Proposal for S&T Directorate topics is uploaded as part of the Technical Proposal, but it is not counted as part of the 25-page page limit.
- Beyond the Phase I 25-page limit, do not send appendices, attachments and/or additional references. The mandatory Briefing Chart is not included in the Technical Proposal page count.

### **Proposal Format:**

- The Cover Sheets, and Cost Proposal MUST be submitted electronically at <https://sbir2.st.dhs.gov>. The Technical Proposal MUST be uploaded electronically at <https://sbir2.st.dhs.gov>. The mandatory Briefing Chart MUST be uploaded electronically at <https://sbir2.st.dhs.gov>.

### **The Technical Proposal Must Address the Following in the Order Listed Below:**

- Identification and Significance of the Problem or Opportunity
- Phase I Technical Objectives
- Phase I Work Plan
- Related Work
- Relationship with Future Research or Research and Development
- Commercialization Strategy
- Key Personnel, Resumes
- Facilities/Equipment
- Subcontractors/Consultants
- Prior, Current, or Pending Support of Similar Proposals or Awards
- Phase I Option technical description, if one is proposed

**Funding:**

- The Phase I proposed cost for the base effort and option are clearly separate.
- The Phase I total proposed cost for the base effort does not exceed \$100,000. Phase I proposals do not exceed six months.
- The Phase I option cost, if proposed, does not exceed \$50,000 and up to four months.
- The Cost Proposal for the base effort is uploaded at <https://sbir2.st.dhs.gov>.
- The Cost Proposal for the Phase I option is included in the Technical Proposal (and is not included in the page count).

**Final Checklist:**

- The Cover Sheets A and B were prepared on-line, and show as “Complete” on the Proposal Activity Worksheet.
- The Technical Proposal was uploaded in PDF format and includes the Phase I technical option description (if proposed), budget narrative and option cost proposal (if a Phase I Option is proposed). File was scanned for viruses and is not locked, password protected, or encrypted.
- The Cost Proposal (for the base effort) was submitted on-line and shows detailed cost and fee/profit breakout. The Cost Proposal for the base effort does not exceed \$100,000. The mandatory
- Briefing Chart is uploaded in PDF format.
- In addition to clicking the “Submit Proposal” button on the Proposal Activity Worksheet, the “Submit Proposal” button was clicked on the “Submit Proposal” page to transmit the full completed proposal to DHS.
- System generated email confirmation acknowledging electronic receipt of your full Proposal was received.
- If at any time before the deadline you have questions about the submission of your proposal, please contact the Help Desk at 703-480-7676 or email at [dhssbir@reisis.com](mailto:dhssbir@reisis.com).

**10.0 TEMPLATE FOR THE MANDATORY BRIEFING CHART**

mandatory one-page briefing chart must be submitted to summarize the project. The Briefing Chart will not be evaluated or used in the evaluation process. It will be used to describe the project if the proposal is recommended for award. It must not contain any proprietary or classified data. Submission of the Briefing Chart is not counted against the 25-page limit. The mandatory Briefing Chart must be in PDF format and limited to 2 MB in size.

<p><b>DHS SBIR Technologies</b>  <u>Title of Proposal</u>  <u>Company</u>  <u>City, State</u>  <u>Proposal Number:</u></p>	
<p><u>Identification and Significance of Innovation</u></p>   <p><u>Estimate TRL (1 - 9) at beginning and end of contract</u></p>	<p>&lt; place graphic related to innovation here &gt;</p>
<p>Technical Objectives and Work Plan</p>	<p>DHS and non-DHS Applications</p>   <p>Company Contacts:</p>
<p><b>NON-PROPRIETARY, UNCLASSIFIED DATA</b></p>	